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The Physiotherapy Review

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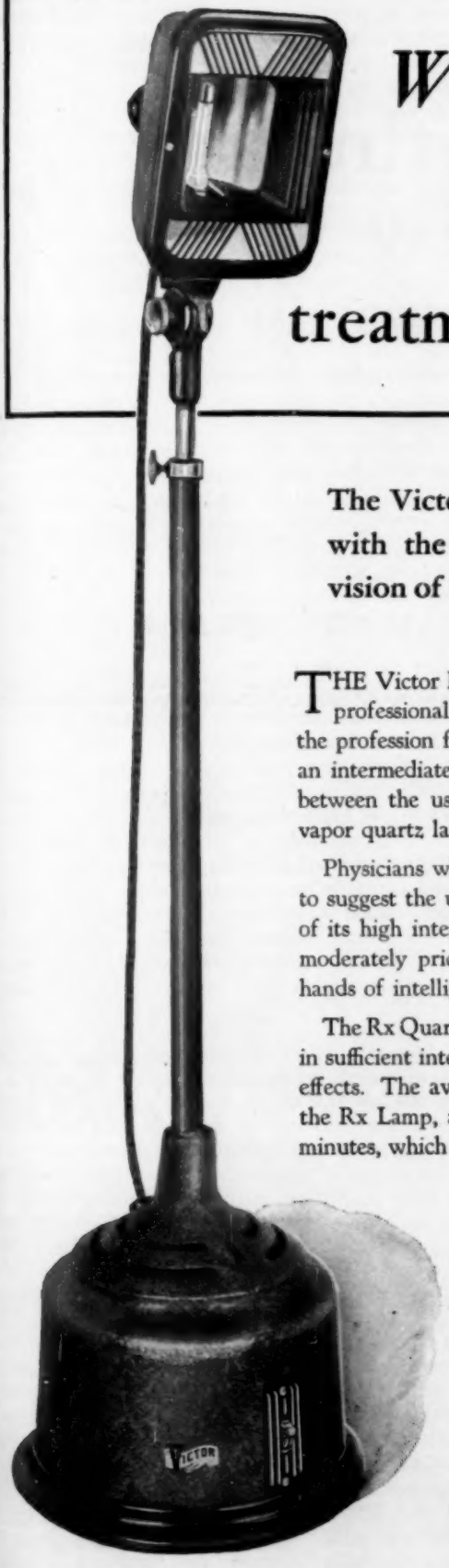

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Good Feet

By Charles R. McClure, M.D.

Read before the Oregon Chapter of the A. P. A.

Being a bone and deformity specialist, I have been asked to give you a talk on feet, describe the normal foot, call your attention to the common disabilities that affect their integrity and comfort and, among other things that have to do with the prevention and correction of foot complaints, devote particular attention to the question of the shoes you wear.

That this is a very important and serious matter is attested by the wide-spread frequency of foot complaints; most adults can give testimony to the seriousness of foot troubles because they, themselves, have suffered from fallen arches, callouses, corns, bunions, ingrown nails, or some type of foot pains and aches. When one's happiness and efficiency is so dependent on the possession of healthy, normal feet, a wider knowledge of how to keep them so is very pertinent and it is in just such gatherings as this that an honest attempt is being made to acquaint the lay public with enough anatomical, physiologic and health facts to aid them in keeping both fit and well; too much needless so-called knowledge is peddled out by the charlatan or some one with something to sell.

THE NORMAL FOOT

Why do we speak of the arches of the feet? The foot is a complicated piece of mechanism; when dissected free of its soft tissue coverings, it is found to consist of many bones held together in such a way as to give the natural shape to the foot; held together by ligaments surrounded by muscles and tendons which serve to protect and operate it, all covered by fat and skin, the external appearance conforms to the relations of the bony structures within; the instep or inner longitudinal arch of each foot forms a half-dome, and when the two feet are placed close to each other, they form a dome, not circular, but elliptical in shape; the dome formed by the two feet rests on the ground all around the edge, from the heel of one foot along the outer border of the foot, across the balls and back along the outer border of the other foot to the heel. Considering one foot by itself, the weight of the body rests upon a half-dome, touching the ground on its outer border, the heel and the ball of the foot, this forming the main or longitudinal arch of the foot. The other arch, the anterior or transverse arch, is just back of the toes across the ball of the foot, this arch giving greater strength and elasticity to the forefoot.

When normally balanced and standing, the foot sags neither in nor out, and the toes project forward in the straight axis of the foot; a ruler placed along side the inner side of the foot touches the heel, the great toe joint and the inner side of the great toe. Any deviation of

the great toe outward is the first step conducive to the formation of a bunion.

The feet are normally elastic, flexible and move freely in various directions; the only movement to which we should call special attention is that of raising the forefoot from the ankle; any inability to raise it above this right angle position, with relation to the long axis of the leg, indicates shortening of the heel-cord and calf muscles and when present is either a potential or real disability; such persons are called "muscle-bound."

Mechancially, then, the foot is an elastic arched structure bearing the body weight, this being one of its two functions; the other function of the foot being propulsion, or to propel the body along or forward. It is well-put in this way: "the feet are to walk with, not on."

When standing or walking, the weight-bearing axis of the leg falls through the outer third of the heel, any tilting of the foot or ankle inward causing the weight-bearing axis to strike too much toward the inner side of the heel and thus bearing down on the long arch instead of along the outer solid support of the foot.

When walking, the normal person keeps the feet pointing directly ahead and not rotated out as very commonly observed; there was a time when such out-toe-ing was considered smart and stylish, even being taught in military academies, but we now know that such ways of walking are conducive to foot strain, as the weight is thrown against the arch or weak part of the foot and not along the solid resisting portion of the sole.

A very erroneous conception of the foot has to do with the height of the long arch; the strength of the arch is not dependent on the height of the arch; one may be born with a very low arch and have a strong efficient foot. Again a very high arch, fallen ever so little, may give a great deal of pain. The point is that the presence of a low or no arch does not necessarily mean a broken arch and so in need of some support; it is very common for well-meaning but misinformed shoe salesmen or chiropodists to recommend arch supports for customers exhibiting low arches, whose feet have never given them any trouble, this being a very good way to start foot complaints. Right here is a good place to state that a shoe salesman is no more competent to advise as to foot troubles than is a drug clerk to advise as to the use of medicines in the many ills to which the human body is subject; neither one is a doctor and did he know as much as he professes, he would not be working as a salesman.

FOOTSTRAIN

Probably the most common of foot complaints is that of flat-foot, or broken arches, sometimes called fallen arches; these are poor terms, illogical and meaningless, but due to their popular use we must refer to them; remembering that the actual height of the arch has nothing to do with complaint, a better term to use is that of "foot-strain," as any type of foot, both the low and high arched, may show the same evidences of strain.

Causes of Footstrain or So-called Fallen Arches

1. Weak muscles and ligaments: this occurs during convalescence from illnesses and especially from the convalescence of childbirth; in rapid growth and in acute illnesses; also following injuries to the leg or foot.
2. Overweight, either from excessive body weight, or from lifting or carrying too heavy loads.
3. Improper placing of weight on the foot in standing or walking, which has been discussed.
4. Over-use of the foot: too long standing or walking, often due to changes of occupation; and to too strenuous exercise, as jumping on a hard surface.
5. Improper shoes. This is by far the most important of all. From early childhood, the foot is encased in a more or less unyielding leather shoe, which is not the shape of the human foot, but almost invariably narrowed and somewhat pointed in its forward part so that the great toe is necessarily displaced outward. In addition, the sole is more or less unyielding, as a rule stiffened in the shank, so that the foot is laced down to a more or less stiff sole, a proceeding which tends to pull down the top of the foot at the end of each step when the weight is borne on the front of the foot. The modern shoe causes crumpling and distortion of the toes and diminishes the power of the toes to spread. The muscles of the foot weaken and weight-bearing use is impossible without strain. The high, narrow base heels of milady's modern-day shoes, by throwing undue weight forward onto the balls of the feet and by overtaxing the supporting ligaments of the ankle, to say nothing of its deleterious effects in general bodily mechanics and posture, is probably the most common causative factor in bringing about foot, leg, and back complaints in girls and women.

Correct Shoes

A shoe should fit snugly in the heel and arch and should allow plenty of room for the toes without crowding and cramping them. Shoes with pointed toes should be avoided; a high, snugly-fitting arch is not dependent on the height of the heel; a shoe salesman may tell a customer that her arch is too high for low heels, yet low or medium heeled shoes may have an arch as high as any high-heeled shoes.

The shoe should have a round or square toe, a medium width shank, and the inner edge of the shoe should be straight from the heel to the end of the big toe; the height of the heel should be within reasonable limits, both extremes being undesirable, the low or medium being preferable and with a broad base. The height of the heel to be worn is of concrete importance in the individual case. When the test of heel-cord length reveals a shorter heel-cord, or one not allowing the ball to come up to a right angle, then the high heel becomes a necessity to assure comfort and efficiency by bringing its weight-bearing column to where the weight can properly be brought to bear upon it. If this is not done, the ball carries more than its share of the weight, with consequent discomfort and disability.

Modern woman like and are accustomed to somewhat higher heels than those now worn by men. There should be no difference for boys and girls up to their teens. Even beyond this there is no inherent reason why they should differ, but after the practice of higher heels has become established, shortening of the heel-cord eventually develops, making a return to lower heels uncomfortable, is not disabling.

In women who have been accustomed to high heels for years, an enforced change to low heels causes disagreeable symptoms with aching of the calf and even the thigh muscles, owing to the lack of proper adjustment of shoe heel to heel-cord.

If all persons were trained to wear only a medium high heel, varying with the ages, it is quite probable that no differences between the sexes would arise but we know well that this is not now the case, and to contend that all women at present should wear low heels or a single height of heel, is quite as unreasonable and trouble-making as are many of the silly practices it is intended to overcome. Feet have individualities that must be considered in their proper dressing.

The excessively high and narrow heels, besides the instability, furnishes a toboggan slide for the whole foot, bringing an excess of body weight on the forefoot and subjecting it to improper stress.

Special dress shoes, not wholly conforming to the physiologic ideal, may be worn on special occasions with probably very little permanent harm to the feet, although at times they may initiate troubles that require much time and attention to overcome.

Women who suffer from the low heels demanded on the golf course should be allowed heels of the necessary height if they will maintain the same area of ground surface.

There has been much discussion as regards the shank of the shoe as to whether it should be flexible or rigid; individuals without foot troubles may do well in flexible shank shoes; those with foot troubles correctible by exercises, only, will do well in flexible shank shoes, but for that large number who need both exercises and support, a rigid shank shoe is, at least temporarily, of much greater value.

Laced shoes are, as a rule, preferable to button. Every individual should make it a practice to change his shoes during the day, if possible. It is advisable, too, that the same pair of shoes be not worn two days in succession. Shoe trees or shoe forms are valuable aids in keeping footwear in shape. Rubber heels are of distinct advantage in minimizing repeated shocks to the foot, legs, and spine. Metal arch supports, as a rule, are highly inadvisable because they act as props or crutches and do not increase the power of the supporting structures of the foot; in fact, when metal arch supports are worn, the short flexor muscles of the sole of the foot are so compressed between the weight of the body and the unyielding arch beneath as to further weaken them and thus do harm instead of good, even though temporary relief has been secured.

Leather or felt supports are valuable sometimes to relieve pain but should not be used indefinitely; they are to be used to keep the bones in place until the muscles can be strengthened by exercises, then the muscles can keep the bones in place without the assistance of an arch support; without proper exercises, there can be no permanent cure from the artificial support for, like any other form of crutch, it is for the purpose of bearing weight while a cure is being effected.

Stockings should be changed daily. It is of great importance that they fit well; too short stockings are frequently responsible for ingrown toe-nails, having a tendency to produce hammer toes and bunions; while those too long may curl up, form wrinkles and cause uneven pressure, thus resulting in irritated areas.

Round garters, if too tight, by circular constriction of the leg are harmful to the circulation; this same effect may be caused by rolling stocking in a hard ridge or knot.

Contrast baths are an excellent tonic, improving the circulation of the soft tissues of the foot and leg. The feet are placed in warm water for one minute, then put in cold water for one minute; doing this five or six times; this should be done twice a day increasing the contrast from day to day.

If time permits, these baths should be followed by massaging the foot for a few minutes. Do not rub the feet, but employ a rolling movement, using the thumbs; the effect may be improved by using cold cream, cocoa butter, or oil of wintergreen or some analgesic ointment.

So-called "rheumatic" pains in the foot may often be relieved by hot applications consisting of flannel dressings wrung out of a hot saturated solution of Epsom Salts.

A few exercises, if practiced daily, will strengthen the feet but do little or no good if practiced only two or three times a week; for feet with weakness of the longitudinal arches, a great many special exercises have been devised. They all tend to exercise and strengthen those muscles which normally have to do with supporting the arches and feet in proper position; only a few can be mentioned and described at this time:

1. Flex or grasp tightly with the toes, as if trying to pick up articles from the floor, this being of especial benefit in anterior arch troubles, do these 100 to 200 times, night and morning, at least.
2. Seated, hold the foot at a right angle to the leg and not turned in or out; flexibly push the toes and ball down, then swing the foot in, next pulling it upward, finally returning to the original starting position; repeat 50 to 100 times.
3. Walk on the outer borders of the foot.
4. Standing, rise on toes and come down slowly, turning heels outward while coming down.
5. This last exercise to be mentioned is especially good for shortened heel-cords: stand about two feet from the wall, place the palms against the wall and allow the back and hips to sag in, at all times keeping heels on the floor. In doing this 25 times twice daily, gradually increase the distance from the wall.

Corns, bunions, callouses, ingrown toe-nails, and quite a variety of other troubles afflict people who fail to observe the principles of foot hygiene.

Corns are of two varieties: the so-called hard corns, which occur on external surfaces, and the soft corns which occur when two skin surfaces come together, where there is constant warmth and moisture, usually found between the fourth and fifth toes and very resistant to treatment.

Callouses are due to inconstant pressure or irritation. Constant pressure produces an ulcer or destruction of tissue, while inconstant pressure produces thickening of tissues. They are most common under the ball of the foot, especially back of the third and fourth toes; here they are due to dropping or depression of the heads of the metatarsal bones, making up the transverse arch of the foot. The individual feels as though he were walking on stones or marbles that the bones are down on the ground and have no padding. This results in an irritation of the periosteum covering the bones and occasionally in bursitis. A bursa is a sack containing lubricating fluid.

To free the feet of corns and callouses, the feet should be washed thoroughly to soften the corns and callouses, then rubbed with pumice stone or scraped to take off as much of the callous as possible.

The feet should be brushed thoroughly with a stiff nail brush. This toughens them and brings increased circulation. This treatment continued daily will soon free the feet of corns and callouses, provided proper shoes are worn; dusting the feet with some non-irritating simple powder and keeping them dry aiding very much.

When a bursa over the inner side of the great toe joint is inflamed, it is called a bunion. When the great toe deviates outward, causing the great toe joint to be prominent and enlarged, the condition is known as *hallux valgus*, but commonly called bunion. Strictly speaking, a bunion may be present without *hallux valgus* and vice versa; *hallux valgus* may be present without the presence of a bunion, although both are frequently seen together, so-called bunions being generally due to the wearing of too short, too narrow or too pointed shoes, separately or in combination.

Other conditions causing trouble in the region of the great toe joint are rigid big-toe joint, rheumatic or gouty joint, fracture or inflammation of the two small bones under the joint, known as the sesamoid bones.

Hammer toes are deformities that may be inherited or acquired; they are commonly the site of painful corns. Over-growing and under-growing toes, if seen early, may be trained to grow in normal position by simply adhesive plaster strapping.

Painful heels may be due to bony spurs or projections on the bottom, sides, or back of the heel-bone, or to bursitis or chilblains in this region. In the latter instances, it may become necessary at times to remove the counter of the shoe, although frequently elevation of the heel will afford relief.

Plantar warts, which sometimes occur on the sole of the foot, are often due to irritation from nails, tacks or irregularities in the shoe or to infection. Treatment of them may be by x-ray, radium or pressure, relieving felt pads used in connection with strong acids applied to cause the unhealthy to separate from the healthy tissues.

Abrasions of the skin should be sterilized with applications of tincture of iodine or a two per cent mercurochrome solution and protected by a small dressing of sterile gauze. Blisters about the heel or other regions, if large, should be punctured by a sterile needle and then treated in a similar manner. A blister forming on the back of the heel from long walking, if covered and protected by adhesive plaster, will soon heal and cause no further trouble.

Cracked or fissured toes should be treated with the application of compound tincture of benzoin and a small sterile dressing; if then strapped to the adjacent toe, there would be no tendency for it to enlarge.

Those who visit chiropodists should insist upon sterilization of all instruments that come in contact with their feet and the utmost cleanliness of his hands, thereby saving themselves from the annoying infections that now and then occur in that way. In the presence of any foot infection, a physician should be consulted at once.

The purpose and problems of this subject have been briefly covered; the many other disabilities affecting feet, due to injuries and diseases, including birth and acquired deformities, demand the attention of a deformity or bone specialist. Most of the conditions discussed are preventable; education and an enlightened intelligence will go far toward preventing them as well as minimizing their effects when present.

Whether male or female, the selection of proper shoes is a vital matter to every individual. Shoes selected should always fit the foot instead of making the foot fit the shoes, which is all too frequently done, thus avoiding the so-called "breaking-in" of shoes so commonly advised as necessary by the shoe salesman. If people were soundly advised as to the shoes they should wear and remember that free advice as to the proper care of the feet by those totally incompetent to give it is worth about as much as the charge for it, which applies equally to the free advice given by the average clerk in our modern-day drug store, a great step forward would have been taken toward preserving the integrity of that very essential member of our anatomy—the foot.

Selleng Building, Portland, Ore.

Zinc Ionization Treatment of Chronic and Subacute Purulent Otitis Media

Presented Before the Colorado Congress of Ophthalmology and Oto-Laryngology
By John G. McLaurin, Dallas, Texas

For many years chronic purulent Otitis Media has been a most annoying and in a large percentage of cases, a most unsatisfactory condition for the Otolaryngologist to handle. The various forms of treatment that have been used have failed to clear up only a few of the cases, and even when surgery is resorted to we are not always satisfied with the results. Any form of treatment that will make it possible for us to relieve permanently a greater number of sufferers of this most disturbing malady, should receive the immediate attention and most careful consideration of those men practicing our special field of medicine.

In presenting Zinc Ionization as a treatment for chronic Otitis Media, I am not offering anything new, nor do I claim any originality in its use or technic of administration. The treatment has been known for many years and has been in fairly constant use in some of the larger European Clinics. During the past few years several of our American Clinics have realized its value and have done good work with it.

I shall not attempt in this paper to educate anyone in the matter of physics or chemistry, but shall try to show how an electro-chemical reaction can be applied by us in handling one of the problems that we meet nearly every day in our practice. From my own experience there is no doubt that the value of electric ionization has been considerably underestimated by most men and that by others it has received very little consideration.

The term ionization means the introduction into the tissues of particles termed ions by use of an electric current. Zinc Ionization, of course, means the introduction of Zinc ions into the tissues. In the composition of the human body tissues we have various salts in solution, such as chlorides, phosphates, sulphates, etc., and some of these are split into their ions, therefore if an electric current is passed through the body there will be a movement of these ions. The direction of ionic movement depends upon the type of iron and also upon whether the positive or negative pole of the battery is applied. The metallic element of a salt will travel from the positive to the negative pole when the salt is acted upon in solution by an electric current. It is therefore necessary when we are using a Zinc solution for ionization, to charge the patient negatively by placing the negative electrode on the surface of the body some considerable distance from the area of ionization. The positive electrode is placed in the Zinc Sulphate solution so that when the current is turned on, the positive Zinc ion travels toward the tissue to be treated. In the ionization of an ear the wall of the tympanic cavity would act as the negative pole and the Zinc would travel to it. Zinc Sulphate is quite irritating to raw tissue, whereas the Zinc ion is much less so. It is therefore necessary to use weak solutions of Zinc Sulphate to minimize the irritating effect, but in doing this the solution would be hypotonic and there would be some damage to the surface epithelium because of the osmotic change between the solution and the cell contents. It is advisable to use an iso-tonic solution and therefore it is customary to add a certain amount of glycerin, which is a non-electrolyte, to the formula. A very satisfactory solution is as follows:—Zinc Sulphate—5 grms., or 75 grains; Glycerin —57.6 ccs. or 2 ounces; and water enough to make 1000 ccs. or 35 ounces. This should be diluted with an equal quantity of warm distilled water when used.

With Zinc Ionization a considerable penetration of the tissues is obtained. This is not so true with the Salicylion because it forms soluble compounds with the blood and its penetration is thereby stopped. The Silver ion seldom penetrates beyond the surface, on account of its quick precipitation with the chlorides. The Zinc ion is not readily precipated, not being affected by the chlorides, and upon its resulting power of penetration its effectiveness is markedly dependent.

The equipment necessary to carry out Zinc Ionization may be of several types, and may depend upon various sources of supply of a continuous electric current. If the city light current is direct, it can be used by placing a resistance coil in the circuit. Another method to obtain the necessary electricity is to use a battery of accumulators connected in series. This will supply a steady current and is quite suitable in some clinics. Probably in an office it is best to use either dry or wet batteries connected in series. The instrument we use is equipped with a Radio B battery which can be quickly replaced when exhausted. There are many advantages in having an instrument that is not too elaborate, and it is well that it be portable. Our outfit is comparatively small but it does all that is required. It is fitted with the necessary resistance coil, a very sensitive milliamperemeter, a switch, and the proper outlets for cord wires that are attached to the electrodes. There is a dial control that is so regulated that the current can be increased or decreased by the very smallest fraction of a milliampere. This is very important for the comfort of the patient.

The technic of administering Zinc Ionization is not in any way difficult, but attention to small details is essential if good results are obtained. The patient is placed in a lying position on the side, with the diseased ear up. The ear must be cleansed with the warm Zinc solution just as thoroughly as possible,

this being accomplished best by filling the ear with the solution and then churning it in and out with a medicine dropper. A good quantity of solution should be used if necessary, changing it frequently so that it will return perfectly clear and free from all detritus into the dropper. Sometimes it is well to instill a weak cocaine and adrenalin solution into the ear ten or fifteen minutes before attempting to cleanse it. This not only anaesthetizes the ear and adds to the comfort of the patient but by producing some shrinkage of the tissues it is possible to cleanse the tympanic cavity more thoroughly. The instillation of a few drops of peroxide may also help in the cleansing process. The ear is now filled with solution and a hard rubber ear speculum is inserted so that it dips into it. The positive Zinc electrode is placed into the solution so that it will not come in contact with any tissue and the negative electrode of either sheet copper or tin is snugly attached to the arm by means of a dampened towel. There should be several layers of the toweling between the skin and the electrode so that burning will not occur. The patient should be instructed to lie perfectly still so that no movement on his or her part would change the amount of current. At this stage the current should be turned on very slowly, gradually increasing it until the amount desired is obtained about ten minutes after starting. This is necessary to avoid undue dizziness and nausea from labarinthine stimulation. For the same reason the current should be turned off slowly. It is best to carry the current gradually up to 3 milliamperes and hold it at this maximum for about ten minutes at the first treatment, provided it does not cause too much discomfort. If subsequent treatments are necessary the maximum may be 3, 4, or 5 milliamperes for a period of ten to fifteen minutes. The physician or a well trained nurse should be in constant attendance with the patient during this time, as some very embarrassing and unfortunate accidents from extreme vertigo can occur. At least, some of the nausea can usually be prevented by having the patient refrain from food for several hours before a treatment. It will be found that patients react differently to the treatment. Some of them are very sensitive and can only stand a weak dose, whereas others can tolerate fairly large doses. If a weak dose is all that can be given, then the time of maximum flow should be extended proportionately. During the treatment the patient will sometimes tell you that the fluid is getting into the mouth and he will spit it out. This means that the eustachian tube is quite patent, and in such a case, additional fluid will have to be dropped into the ear during the process of ionization. If the condition of the tube has been playing a part in keeping up the tympanic trouble, it is probable that the flow of Zinc solution through it during the ionization will have a satisfactory sterilizing effect on the tubal mucous membrane. After the ionization has been completed the patient is allowed to turn over on the treated ear and the solution flows out, after which a piece of sterile cotton is placed in the outer canal to serve as protection from further infection.

It will be recalled that in chronic purulent Otitis Media we have a discharge in the tympanic cavity and that it becomes stagnant and is invaded by various forms of germ life. This decomposing serum and purulent exudate with its bacteria, produce further irritation with the formation of more serum, dead leucocytes, and by-products of inflammation. It is possible to remove the visible discharge by properly cleansing the ear, but there will still remain a layer of serum, leucocytes, and bacteria adhering to the surface which we may term the "microscopic layer." It is this "microscopic layer" that is attacked by ionization, and the success of the treatment depends upon how thoroughly it is sterilized. The Zinc ion, in penetrating the tissue, sterilizes completely all with which it comes in contact and leaves on the surface a sterile coagulum, which acts as a protective coating. This coagulum must not be disturbed, for the healing process occurs beneath it. After three or four days the ear may be inspected at which time a watery discharge may be noticed. A little powdered Boric Acid may be blown into the ear every three or four days until healing is complete. I wish to quote here what Professor Leduc of Nates says of Zinc: "This ion is an antiseptic of the first rank, and there is no wound or ulcer which cannot be disinfected by its employment, provided its surface can be reached by the electrodes. One of its peculiarities is that it provokes but little inflammatory reaction. When I have experimented with Zinc upon the skin of animals, and have caused superficial or even deep ulcération, I have observed that the wounds produced show no inflammatory effect or sign of infection from germs, even if they are completely uncovered; on the contrary, they remain aseptic, so that it appears as if the ions of Zinc which they contain serve as the best possible of antiseptic agents."

The problems we have to contend with are as follows: First, to kill the bacteria in an albuminous matrix coating the surface. The Zinc ion will do this. Second, to apply the Zinc solution and distribute the current. This is a mechanical affair; and, third, to avoid re-infection. This is frequently a bacteriological question, in which instance, it is dealt with successfully by aseptic and antiseptic technic. The question of re-infection, however, brings up another important consideration,—that of placing the patient in a condition so that recurrence of Otitis Media will not take place. Chronically infected tonsils, enlarged infected adenoid tissue, chronic sinus disease; a badly deflected septum, and hypertrophy or degeneration of the posterior tip of the inferior turbinal, should be dealt with in the proper way. Any of these conditions may have originally been responsible for the ear trouble, and might be capable of causing Otitis Media again unless they are corrected properly. Ionization of the ear is not likely to be successful unless we deal first with any nasal or oral sepsis that is present. With whatever method of treatment we intend to use in handling chronic purulent, Otitis Media, it is our first duty to rid the patient of the primary source of infection before we can hope to accomplish much in prevention recurrences. This holds just as true in cases treated by ionization as it does in cases handled by some other method.

If we expect success by Ionization we must be extremely careful in the selection of our cases. In those where there is definite involvement in the mastoid-antrum and cells, we surely cannot look for satisfactory results from this treatment. The history of the case and the radiographic studies will help us select those that are to be relieved by ionization, however, Zinc ionization may be very helpful to us in arriving at a positive diagnosis. In those cases of chronic Otorrohea where ionization properly administered does not give satisfactory results we should look for a more deep seated source of the discharge. Where the discharge is dependent upon a true tympanic involvement, without caries of the bone or cholesteatomatus formation. we can usually expect to get a satisfactory response

to ionization. In some instances an examination of the tympanic cavity will show patches of granulation or polypoid degeneration and in such cases it is necessary to remove such tissue, either by chemical cauterization, electrolysis, or some other method before Zinc ionization is used.

Clinical observation shows that undoubtedly a large percentage of these cases that have resisted the ordinary methods of cleansing and attempted sterilization by the various germicidal agents, will respond to ionization. In some of the larger clinics where this treatment is in use, numerous cases that have not cleared up under the ordinary forms of treatment, have responded to two or three ionizations. We have seen many cases in adults where the ears have discharged since childhood and in which all efforts to cure have resulted in failure. In many of these, the ear has become dry and healed after a few ionizations and the proper steps taken to prevent re-infection.

We must not consider Zinc ionization as a cure-all, for there will be some failures where we feel we were justified in expecting good results. On the other hand, some cases will respond to treatment when we do not expect them to do so. Possibly this occurs because we cannot always be positive about the selection of our cases. A visualization of the sterilizing process obtained by ionization will make one realize that every case cannot be handled successfully. A running-ear has always been a bug-bear to the Aurist, and it is because I have some faith in ionization, resulting from experience with its use, that I commend it to your more careful consideration with the hope that you may have some success in handling more of these most unsatisfactory cases.

CASE REPORTS

Case No. 1—W. D. D., age 37. Right ear has discharged almost constantly for thirty years.

LOCAL FINDINGS show perforation ⅛" in diameter in upper anterior quadrant of drum. Heavy mucopurulent discharge in the tympanic cavity and outer canal.

DIAGNOSIS: Chronic Purulent Otitis Media.

INFLUENCING FACTORS: Small, cryptic, submerged, chronically infected tonsils. Deflected septum, crowding the left middle turbinal.

ZINC IONIZATIONS: Oct. 8—3Ma. 10 min. Oct. 13—very light discharge, 3¼Ma. 10 min. Oct 19—ear perfectly dry; another Ionization 4Ma. 10 min. Oct. 27—ear perfectly dry; catheterization shows right tube wide open. Jan. 4—ear draining a muco-purulent discharge. Patient suffering with an acute upper respiratory infection. Tonsils, pharynx and nasal mucosa are red. Considerable pus in the naso-pharynx. Nose sprayed with argyrol solution. Advised removal of tonsils as soon as acute infection was entirely relieved. Jan. 5—less discharge from the ear; 20 per cent Silver Nitrate applied to tonsils, 3 per cent Silver Nitrate to naso-pharynx. Jan. 7—no discharge from ear. Silver Nitrate to tonsils and pharynx. Jan. 19—tonsils removed under local. Jan. 23—tonsillar fossae healing nicely. Ear is dry. Jan. 26—throat healing nicely, ear is dry. May 15—ear has given no more trouble, is perfectly dry.

Case No. 2—Miss B. G., age 23:

HISTORY: Chronic nasal discharge, almost constant for several years. Most of discharge comes from front of nose and seems to remain of the same character.

SYMPTOMS: Aggravated in damp weather. Since early childhood has had almost constant discharge from both ears.

EXAMINATION: Shows an incomplete tonsil operation has been done. Large pieces of tonsil tissue left in each fossae, especially in left side. Pus expressed on pressure. NOSE shows a deviation of the septum to the left, low down in front, producing contact with the left inferior turbinate. EARS: A. D. Complete loss of the membrana tensa with a thin purulent discharge in the tympanic cavity and outer ear canal. A. S. Drum shows medium sized perforation in the lower posterior quadrant with a thin purulent discharge in the tympanic cavity and outer ear canal. Hearing in each ear is markedly reduced.

TREATMENT: Sept. 6—Sub-mucous resection under local. Uneventful recovery. Sept. 13— Tonsillectomy under local. Jan. 12—patient complaining of large amount of drainage from left side of nose. EXAMINATION shows pus coming from the anterior Ethmoidal cells. Complains of pain above left eye and in left cheek. TRANSILLUMINATION shows left antrum dark. Some of the anterior Ethmoidal cells were removed to create free drainage of left frontal Sinus. Some pus found in these cells. Douglas puncture of the left antrum followed by rasp enlargement. Irrigation showed large amount of pus in the antrum. Several irrigations of the left Frontal Sinus and left antrum seemed to clear her of trouble in those regions.

EARS had not been influenced by the above treatment.

IONIZATIONS: March 25—right ear 3Ma. 10 min. Mar. 27—doing well. Coating of coagulum present. April 1—doing nicely, no drainage. Small patch of granulation tissue present. April 3—complaining of pain in left ear. Examination shows redness and bulging in upper segment above performation. Left drum punctured—serious discharge. April 7—both ears doing nicely. Moderate discharge from left, no discharge from right but raw granular patch on medial wall of tympanum persists. Granulations burned away with Trichloracetic acid. April 10—left ear ionized 3Ma. 10 min. Right ear draining. April 12—no drainage in left ear. Right ear doing nicely—moderate amount of sero-purulent drainage. April 13—left ear dry, apparently healed. Right ear draining moderately. Cleansed with alcohol and boric. April 18—right ear cleansed—very small area of granulation tissue present on medial wall. Burned out with 50 per cent Silver Nitrate. April 20—profuse drainage from right ear, left ear dry. April 24—drainage from right ear less copious. Left ear dry and healed. April 28—right ear apparently free of granulations, but still draining moderately. April 29—right ear ionized 3½Ma. 10 min. Left ear dry and healed. May 1—right ear draining very slight amount of watery material. May 3—right ear shows no drainage—tympanum covered with white coagulum. Left ear dry. May 13—right ear ionized 3½Ma. 10 min. May 15—no discharge. White coating over tympanum. May 18—condition good. Both ears dry. May 20—no discharge. May 29—both ears dry. June 17—both ears dry and membrane of tympanic wall is smooth with normal color. July 8—both are perfect. Hearing has been markedly improved.

Case No. 3—JGN—age 7

HISTORY: Left ear has been discharging for sixteen months. Four months ago a radical mastoid was done by Dr. B. in an effort to relieve this chronic dis-

charge. The wound healed well but the ear continued to drain. Tonsils and adenoids removed by Dr. B. three years ago.

EXAMINATION: Throat shows that tonsils were removed cleanly. Nose shows no trouble of importance; good drainage and ventilation both nasal chambers. Left ear shows heavy purulent discharge in the left tympanic cavity and outer ear canal.

IONIZATIONS: April 3—3Ma. 10 min. April 5—ear dry, white coating deep in canal. April 9—slight muco-purulent discharge. Complains of some tenderness behind ear. April 12—no discharge. April 25—patient has had chicken-pox since last seen. Profuse pussy discharge in ear. Complete facial paralysis on right side (toxic?). April 26—ear ionized 3Ma. 10 min. April 28—ear dry, facial paralysis clearing. April 30—ear dry, facial paralysis clearing. May 2—slight mucus discharge in ear. May 6—ear dry. May 13—ear dry. May 16—mucus discharge in ear. Patient has fresh cold, much pus visable in naso-pharynx. Rx. nasal drops. Ear cleansed with alcohol. May 19—ear dry. Much pus in naso-pharynx. May 29—ear dry. June 2—ear dry, pus in naso-pharynx, facial paralysis entirely cleared up.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of August 24, 1912,

Of THE PHYSIOTHERAPY REVIEW published bi-monthly at Mount Morris, Ill. for October, 1931.

State of New Jersey } ss.
County of Essex }

Before me, a notary public in and for the state and county aforesaid, personally appeared Dorothea M. Beck, who, having been duly sworn according to law, deposes and says that she is the editor of THE PHYSIOTHERAPY REVIEW and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Kable Brothers Company, Mount Morris, Ill. Editor, Dorothea M. Beck, Montclair, N. J. Managing Editor, Dorothea M. Beck, Montclair, N. J. Business Manager, Gertrude Beard, Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one perecent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) The American Physiotherapy Association, President, Edith Monro, Boston, Mass.; Treasurer, Mabel E. Holton, Ann Arbor, Mich.; Secretary, Constance K. Greene, Swampscott, Mass.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

DOROTHEA M. BECK, Editor.

Sworn to and subscribed before me this tenth day of October, 1931.

ERLAND M. NELSON, Notary Public.

(My commission expires April 8, 1932.)

Efficient and Inefficient Physiotherapy

By James T. Watkins, M.D., F.A.C.S.

Read before the San Francisco Casualty Insurance Attorneys Association, April, 1931.

The problem of the mounting costs of medical treatment for the industrial injured is an urgent one. Its solution calls for more judgment than probably any one individual can give.

Speaking as a medical man—and admitting always that there may be aspects of the problem and conditions of which a medical man can have no knowledge—certain features of the situation which can be set down as fairly well established have been apparent to me. In the first place, the companies are not niggardly. They want to pay adequately for demonstrable bona fide injuries. Second, as a rule, their claims attorneys are fair minded men. There are exceptions here, as everywhere else in life, but I feel confident, from personal observation over a number of years, that this situation is fairly indicative of the attitude of both companies and their representatives toward a frank case of injury.

I have observed, however, evidences of irritation on the part of the companies' representatives with the costs of medical service. Now, I expect to show that the greater part of this irritation is justified. I expect to show that, not always by any means but in many instances, the companies and their injured charges are not fairly treated. Also, I believe I have worked out a plan whereby, if the companies and their representatives will work together, they can, without offense to reputable members of the medical professions, cause a large part, possibly the greater part, of this overcharging and inadequate treatment to be eliminated.

Now, before I discuss the causes of this irritation—and they are very real, for the irritation is largely justified—I want to say something about Physical Therapy, or the treatment of disease by means which are not biochemical (that is, not by drugs).

For more thousands of years than I would venture to name, man has been more or less successfully combating the inroads of disease, or the after effects of injury by physical means; that is, by the application of heat and cold, either through baths or packs, or sweat tents and the like, and has sought to improve the condition of the tissues by rubbings, kneadings, poundings, etc., which properly coordinated are called massage. Latterly, our Physicists have taught us to separate the components of light so that we can at will use the heat or infra-red rays, or at the other end of the spectrum the ultra-violet rays, which hasten tissue change. Latterly, too, we have been working with various forms of electricity. Now, if you exclude the electrical phenomena, none of this is new. It has stood the test of experience during thousands of years, and by peoples in all climes. Again, I need not touch on the gymnastic side, because that too, as you know, has been so exhaustively worked out, that, since the time of the Greeks, there have been recognized schools of curative gymnastics.

In this country this physical form of treatment received a tremendous impetus during the World War. Basing his opinion upon the greatest clinical experience our Western World has seen, the Surgeon General assured me personally in 1925 that he could not get enough physical therapists and was going to inaugurate his own school. He has since done so.

Your grievance, then, cannot come from *USE* of these types of therapeutics. It must come from *ABUSE* of them. Our problem, therefore, is to determine the means by which these abuses may be eradicated.

Undergraduate instruction in physical therapy was not a part of the curriculum leading up to the degree of Doctor of Medicine, until recently. What medical men know of it has all or nearly all been picked up since graduation, usually in the course of practice. Therefore, we cannot *KNOW* that men who use physical treatment incorrectly or inadequately do so intentionally. *I incline to the belief that they do not;* that their sins of omission and of commission are the outcome of ignorance, or at the best, of scientific indifference. It is enough for them that it is SAID to do good; that, so far as they know, it cannot do harm; that the patients like to feel that something is being done for them; that the doctor does not need to consume valuable time by carrying out the detail of treatment himself; and finally, there is from a dollar and a half up in gross profit for each patient treated—a dollar and a half which the doctor would not otherwise get, whether he deserves it or not! Of course, there are unscrupulous persons in every walk of life; but they are so much the exception that I think my remarks represent about the worst that can be said for a majority of those physicians who *misuse* physical treatment.

In this more or less uncertain state of affairs, and recognizing that treatment by physical means has come to stay, the most that you or I can do at this time is to determine in detail what is the minimum plant which a man proposing to do such work should possess: what apparatus, what equipment should actually be in his office, and since he practically always refers the detail of treatment to an employe, what is the average number of cases that a properly trained physical therapist can handle efficiently in an eight hour day?

Once that is done, you have only to make it obligatory upon the industrial surgeon you employ to live up to these perfectly reasonable conditions and, as I shall show presently, at one stroke you have cut off at its roots the chief cause of your non-operative medical expense. But you will have done more; you will at the same time have increased the efficiency of his treatment as it applies to the individual case and thereby will have cut down your permanent partial disability ratings as well.

The first thing to do, then, is to see to it that everyone who understands physical treatments shall be properly equipped to that end. The second thing is to make a still greater effort to see to it that the physical therapist

has time at her disposal adequately to treat each patient presented to her.

With these thoughts in mind, the Secretary of the American Physiotherapy Association wrote to each chapter before its convention in 1929, asking it to send its delegate to Portland, properly instructed how to vote on these two questions. Their conclusions are printed in full on page 220, Vol. IX, No. 5 of the PHYSIOTHERAPY REVIEW. There we learn that the physical therapists of America unanimously agreed that a trained physical therapist can adequately handle an *average of fifteen ambulant patients a day* if supplied with one diathermy, one sinusoidal and one galvanic machine, with one water cooled and one air cooled quartz light, one infra-red light, one baker, one leg and one arm whirlpool bath, and a moderate amount of gymnastic apparatus. But this is the *minimum;* with less than that she cannot properly work.

Now if you demand these two things and stick to them, you will, as will appear in a moment, at one stroke cut out what I, improperly perhaps, call the "graft" in Physical Therapy.

But if you want to go further and assure yourself that your medical employee is acting *intelligently* as well as honestly, *this is not enough.* You have already, in a variety of ways, supplied him with blanks to fill out, blanks which record the current cost of treatment and the purely insurance aspects of the case. I repeat, this is *not* enough. To get efficient work, you must supply him with a reasonably simple set of physical therapy blanks that can be easily filled out and which set forth:

1. *The Diagnosis*—what he proposes to treat.
2. The Prescription—How he proposes to treat it. What and how much light. What and how much electrical current of one type or another. What and how much massage, etc.
3. The Prognosis—What he expects to accomplish with treatment and in what time.
4. The Course—Changes made in treatment as the case progresses.
5. The Discussion—Including what is the reason he hasn't obtained his result in the time he anticipated it would take him.
6. Complications—
7. The Progress—A graphic record showing in degrees of motion the bi-weekly improvement of the case.

Have such reports sent to your office once a month and several things will happen: a. He will become a student of his means of treatment. b. His patient, by inspection of the graphic chart's record of improvement, will be maintained in a healthy and co-operative state of mind. c. You will have at hand a method of check-up which will infallibly show you whether or not he is getting results, and when he stops getting results. (Any $75.00 a month clerk can at a glance read a graphic record). In other words, the greatest leak lies in: 1. An inadequate plant. 2. In overcrowding your physical therapy technician. 3. Inattention to detail on the part of your doctor. By this means these features can be eliminated.

I pause to advise you that at the 1930 American Physiotherapy Association's meeting (it met in Detroit at the same time as the American Medical Association) I offered a considerable cash prize for the best practical system of Physical Therapy records which would be acceptable to the companies.

Now to do all this, you must have the backing of authority; and authority has been found for you in these official pronouncements of the American Physiotherapy Association; in matters purely practical, the most weighty authority obtainable in America today.

Now frankly I have never been much impressed with the spirit of your criticism. It seemed to me rather to seek its audience in the Home Office and I hasten to add that therein you are no different from any one else. However, assuming that you are as sincere as you are vociferous in your lamentations—assuming that you have that something in you which can enable you to transmit your scoldings into creative action—the cure of the ills you protest is easy of application and is in your own hands. Furthermore, it is as simple as it is reasonable.

As your companies' representatives, you do not have to employ any man unless he measures up to your requirements. If your pet employee does not meet them (he will, of course, if you make him) send your patients to some one who will meet them. I repeat: All that those requirements need be is: 1. That he provide that plant which authority has minimized as necessary. 2. That each physical technician he employs be limited, on the same authority, to fifteen cases a day. (A fact that you, as your companies' representative, will verify from his physical therapy books.) 3. That proper records be kept, just as they are in all other kinds of medical cases, and carbon copies filed with your office at appropriate intervals. There is nothing to it, gentlemen, assuming only that YOU have what the phychiatrists nominate "the will to do."

When the American Physiotherapy Association met in 1929, as I have previously said, its delegates from all over the United States voted that the equipment I have named represented a *MINIMUM* for the treatment of ambulant cases.

MINIMUM COST OF MINIMUM PHYSICAL THERAPY PLANT

(DATE: SEPTEMBER, 1930)

Furniture	$ 95.00
Electrical apparatus (diathermy, sinusoidal, high frequency, etc.	1,110.00
Hydrotherapy (whirlpool, hot packs, etc., including installation)	615.00
Lights (bakers, infra-red, water-cooled and air-cooled u tra violet, etc.)	1,028.00
Miscellaneous (blankets, sheets, pans, pitchers, scales, etc.)	156.00
Gymnastic apparatus—$96.00. (This is inadequate for industrial work; $300 is nearer the mark)	300.00
Total cost	$3,304.00
Installatien (estimate only)	196.00
	$3,500.00

MINIMUM COST OF MAINTENANCE PER MONTH

Salary (trained physical therapy technician)	$ 150.00
Rent (a part of a doctor's office. Alone it would be $150.00)	60.00
Telephone	10.00
Laundry	20.00
Drugs, supplies	10.00
Depreciation (Government allows life of five years)	60.00
Taxes	5.00
Fire insurance	2.50
Interest on investment	2.50
Vacation (two weeks with pay, $75.00 or $6.25 per month)	6.25
No al'owance made for sickness but it should be done (estimate only one girl working)	0.00
Allowance for mechanic to overhaul plant monthly and replacements	6.25
Total monthly upkeep	$ 350.00
Yearly upkeep	$4,200.00
Daily upkeep (365 days less 60—52 Sundays, 8 legal holidays—305 days)	13.75

INCOME

15 patients at $2.00 per day for 305 days	$9,150.00
Less upkeep	4,200.00
	$4.950.00

But not one office in fifty where Physical Therapy is being used is equipped with this *MINIMUM* plant. Therefore, adequate treatment can not be given. Some men have such a plant. They, in accordance with the decision of the American Physiotherapy Association, are entitled to treat with it *FIFTEEN CASES A DAY*. Actually, some have been known to treat *FORTY CASES A DAY*. This may be an extreme and exceptional case. However, let us consider it. It means that each patient was getting a shade more than *one-third* the treatment hours *he needed*. Increase in permanent partial disability payments in the final rating resulting from this poor service rendered the patient cannot be estimated.

The essence of my contention is that that aspect of the healing art which we nominate Industrial Medicine is strictly a business, and that, in your dealings with it, you should inform yourselves of its costs, of its possibilities, of its limitations, of its hazards and of its profits, just exactly as you would if you were, let us say, writing fire insurance. You are in a position to do this, because they, the industrial surgeons, are competing with each other for your business.

I suggest the following circular letter as an effective remedy:

Dear Doctor:

At its meeting, coincident with that of the American Medical Association, in Portland, 1929, the American Physiotherapy Association voted unanimously that the following minimum plant was necessary for the proper treatment of ambulant cases of Industrial Surgery. (Here follows the description of the plant.) It also voted unanimously that one trained Physical Therapy Technician, equipped with such a plant, could properly treat an average of fifteen cases in the course of an eight-hour day.

These pronouncements on the part of this national organization are accepted by this company as authoritative.

Please be advised that in the future this company will not authorize nor pay for physical therapy treatments unless it can be shown that the Industrial Surgeon prescribing them has at his command the minimum plant here indicated.

Further: Please be advised that this company will neither authorize nor pay for treatments unless it can be shown that, with such a plant as is here indicated, not more than fifteen cases, from any and all sources, are being treated by each Physical Therapy Technician employed.

Finally: Surgeons to be employed by this company must be prepared to show that they have conformed with these stipulations.

A copy of this letter has been filed with the Industrial Accident Commission.

(Signed) THE COMPANY,

By — —, Claims Attorney.

San Francisco, California.

Survey of Prevailing Theories and Methods of Treating the Spastic Patient With Physiotherapeutic Applications

By Ruth Aust

In Appreciation of Doctor Charles Le Roy Lowman and members of the staff of the Orthopædic Hospital-School Clinic who have been the source of encouragement and inspiration

PART I—INTRODUCTION

THE PROBLEM OF TREATING THE "SPASTIC" PATIENT

This study of the treatment of the spastic patient has been made with the following aims:

1. To summarize the etiology, theories of therapy, and to discover the most successful technic now prevalent.

2. To analyze some of the difficulties encountered in treatment of the "Spastic."

The spastic has remained an unfinished problem in practically all forms of treatment, yet certainly not because the problem is limited. Doctors Sharp and MacClaire (W. Sharp and MacClaire, A. S. Surg. Gynec., and Obst. 38:200-206 Feb. 1924) report 13 out of 100 consecutive deliveries had symptoms of cerebral hemorrhage with spastic symptoms. Our state institutions always have a great number of such cases. Along with this astonishing percentage is the group of brain injuries which parallel closely the characteristics of the spastics. Moreover few studies have been made of the problem as a whole, trying to get a bird's eye view of the entire life of the spastic patient.

The medical profession, orthopædic, physiotherapy, and occupational therapy disagree. Those who have something of real value to offer have expressed themselves meagerly. The prolonged care and financial burden to the family and state alone justify a lengthy investigation for relief.

There are many difficulties in compiling such information. The scope of literature is restricted. Most of it is from the purely medical and orthopædic viewpoint. The endocrinologist has offered only a small part of it. The psychologist has been extremely handicapped with the patient having speech defect and unco-ordinated movements. Much is being done from this angle which is not available in print. The physiotherapeutic angle, while forming a large share of the treatment as a whole, has varied according to the technician and doctor. Results being difficult to substantiate is one reason for this. Nature, also, is responsible for some gradual improvement. The treatments are characterized by spurts of improvement followed by upsets and relapses. With prolonged training, only gradual limited improvement, and lack of trained therapists, it is no wonder the prevailing attitude is one of skepticism.

It remains a problem to be solved. However, attention is being focused upon it. The recent investigations of Doctors Royle and Stoffel are prognostic.

The following has been compiled from current articles published during the last five to ten years, as listed in the Quarterly Cumulative Index, the information available from the American Medical Association and the American Orthopædic Association Libraries. Technicians in Los Angeles who are especially interested in this problem have been interviewed.

PART II

CHAPTER I—CAUSES OF SPASTICITY

Cerebral spastic paralysis or Little's disease (Infantile Cerebral Palsy) results from injury, disease, or faulty development. Occasionally no discoverable cause is found for spastic symptoms which may appear at any age.

The injuries causing spasticity may take place during fetal life, at birth, or later. The greater number occur during birth. These are produced by: faulty delivery such as head first, delayed, premature, and delayed presentation in head-last position. Other causes are: use of high forceps, asphyxia due to the cord wrapped around the neck or pressure during delivery, the common tendency to hemorrhage, and infection. Freud suggests that the underlying cause of a premature birth may be responsible for the paralysis, also. Injuries received after birth are due to trauma, such as compression, etc.

Many different kinds of diseases may leave the victim with cerebral spastic paralysis. Any disease which can produce an embolus (clot in blood stream), thrombosis (clot remaining at point of origin), sclerosis (unusual increase in number of cells in connective tissue, causing hardening of nervous system), vascular lesion, or degeneration of the brain is included. Fat emboli sometimes find their way to the brain following a fracture or bone operation. The obvious diseases are whooping cough, fevers, diphtheria, pneumonia, and eclampsia (convulsions).

Sometimes the spasticity may be definitely due to faulty development of the fetus. At times, there are cavities in the brain cortex, due to arrested development or atrophy of the brain matter called porencephaly. Abnormal smallness of the head is another type of maldevelopment, called microcephaly. Failure of development of the gray matter may be the underlying cause. Perhaps much of it is due to syphilis. Again, the fetus may be mal-developed from a maternal weakness brought about by repeated pregnancies.

In view of treatment for these cases, it is very important that the cause be determined first. A patient

with a progressive degeneration of brain cells would clearly have a different result to be hoped for, than a patient suffering from a compression. The treatment would necessarily be directed for different results.

Then, too, different kinds of damage and destruction occur with the above causes.

It is interesting to note the different ways the muscle function has been affected. Prognosis of a cerebral spastic patient is dependent, especially to the physiotherapist, upon the pathology. The actual damage done the nerves will make one case present an entirely dissimilar problem to that of another.

In a (11) the congenital type, there may be an under development or entire absence of convolutions. Otherwise, there is probably imperfect myelinization.[1] "This is due to atrophy, cystic degeneration, or thickening of the walls of the vessels, hypertrophy of the connective tissues, while the nervous elements disappear." (3) If the pyramidal tract has not been affected nor hypertrophy of connective tissue blocks the stimuli, neuromotor control may become possible through a re-established circuit.

The extent of involvement is of uppermost importance. This is either in the certain area of the brain, known as the motor area (pyramidal) or included the lateral columns of the spinal cord (extrapyramidal). The latter being the more extensive is the more serious problem. The pyramidal area acts as a control center, and the pyramidal tracts as the wires going to the muscles. The differentiation justifies a more thorough explanation.

CHAPTER II—COMPARISON OF PYRAMIDAL AND EXTRA-PYRAMIDAL MOTOR INVOLVEMENT WITH SYMPTOMS

The general process of neuro-motor cycle will exemplify. The sensations (afferent impulses) are sent immediately to the receiving area of the brain, sensorium in the Rolandic or the motor area. From there the efferent impulse goes, by means of the pyramidal tracts, down the spinal cord, and to the muscles.

Each unit of this circuit is of tremendous importance. Damage to any one section has its special consequences and yet all are so inter-dependent.

In the first place, the sensations pour over the primary reflex arcs clamouring for reactions.

It is the special duty of the motor area of the cortex to act as the generalissimo. Many of these sensations should be ignored. Some of them should be answered calmly, others with great speed and strength. This moderator and selector controls the reaction of the muscles. Each stimulus is passed on by the center which determines how best to respond to it.

The motor area has another very important function. As the driver of a group of thoroughbred horses, holding their excitement and nervous energy by the reins, holds them ready to dash and yet not leaving, so does the motor area of the brain seem to control the tonus of all voluntary muscles at a state most expeditious to execute any movement on command. It is responsible for the amount of reaction of muscles and their state of relaxation prior to contraction.

If parts of this area are affected or destroyed, we would have the lack of such a control.

"Stimuli[2] would be immediately converted into motor impulses and determine muscular contraction." Almost every stimulus reception would immediately produce a muscular contraction of some sort.

There is another symptom. The source of motor power which heretofore has been constantly slowed up, would pour forth energy to the muscle tissues. This resulting condition is hypertonic or spastic. The muscles will be in a state of contraction, consequently rigid. If the antagonistic pull is uneven, deformity results. If certain volitional cells have not been damaged, they would still have a very difficult time getting these hypertonic cells to reply to their orders.

The extra pyramidal motor system or pyramidal tracts act as the electricity does to a telephone circuit. It seems to supply the force behind muscle tonus. When it is destroyed there results a flaccid type of paralysis.

The fibers of the extra pyramidal system originate in the corpus striatum where we find two different types of cells. The larger ones seem to be distinctly motor in function. The small ones probably are inhibitory and co-ordinating.

This system is responsible for movements of babies before their volitionary power begins. It seems to provide[3] "for the performance of certain automatic acts which may still be possible when all voluntary motor power is lost, and likewise controls certain automatic and associated movements." Motor patterns and new co-ordinations are not in its power. But since it is so elementary and is the force behind the throne, we can teach it nothing and are more or less helpless when it is destroyed.

One patient may have an involvement of both the motor area of the cortex and the extra pyramidal system. The absence of certain reflexes demonstrates this condition. This will be taken up later after reflexes.

Common terms are used for similar types of involvement to aid in classification of patients.

When a single upper or single lower extremity is affected, the condition is designated "Monoplegia."

If half the body is paralyzed (right or left), the term is "Hemiplegia."

When both upper and lower extremities are affected, due to lesions of both motor areas, the symptoms are "Diplegia."

When both upper and lower extremities are affected and the lesions are of the superior longitudinal sinus, the term is "Quadriplegia."

If both lower extremities are paralyzed, it is a case of "Spastic Paraplegia." In this the contracture spasm is greatest at the adductors and not at the distal part of the limb. When standing, the trunk is bent forward, thighs in close contact with each other, and feet separated. When walking, the legs tend to cross and the feet scrape floor. Seated, the legs are extended.

Dr. C. L. Lowman says: "A spastic is not only a spastic—he is of some kind."

As a summary, the message cannot go through to the muscle if the atrophy occurs in the pyramidal tract. There is no force to turn on. If it is in the motor area, however, new motor patterns may be learned, and there will be the necessary force to execute them.

The problem becomes more complicated the more it is studied. Still, before one can make an approach to treating such a case, the elements of the problem should at least be realized.

We will try to analyze some of the mysteries within the problem.

CHAPTER III—THEORIES OF MUSCLE TONUS AND POSTURAL REFLEXES

The type of approach in treatment especially surgi-

[1] J. A. Nuther, M.D., "On Spastic Paralysis and Its Treatment," Canadian Medical Association Journal, November, 1926, Vol. 16.

[2] Tilney, Frederick, M.D., Ph.D., and Henry Alsop Riley, A.M., M.D., "Form and Function of the Central Nervous System." 2nd Edition, Paul B. Hoeber, 1923, N. Y., pp. 836-45.

[3] Dawmun, Chas. E., M.D., and Michael Hoke, M.D., "The Treatment of Spastic Paralysis," reprint 1924.

cal, depends on the accepted physiological explanation. Theories to explain spasticity, however, are still presenting themselves.

Following are the more important ones attempting to explain the tonus (sustained contractility) of muscles—spasticity being a state of hyertonus.

Theories: 1. Different type or nerve supply from that employed in voluntary contractions; 2. Different type of metabolism of muscles; 3. Employment of different muscular structures.

Hunter and Royle maintain that tonus muscles are not only different in structure, but have quite separate enervation.

Orbell maintains that stimulation of the sympathetic, while producing no contraction of the muscle, enables the muscle to withstand the onset of fatigue.

Boeke believes that both kinds (medullated fibers of the anterior roots and sympathetic post ganglionic supply) of nerve fibers may be distributed to the same muscle fiber.

Until better evidence can be presented, the majority of physiologists seem inclined to reject the idea that tonus is regulated by the sympathetic supply and to continue to believe that the peripheral structures concerned in tonus are the same as those employed in the execution of ordinary contractions.

"Sherrington[4] theory is generally the accepted one. He conceived muscle tone as a reflex reaction, the stimulus for which comes from a proprioceptive source and the purpose is to maintain posture. He believed that there are two reflex pathways concerned in the innervation of a striated muscle. The one has to do with initiating a regulating state of tension within the muscle itself, the reflex reactions of which are tonic in character. Stimulation of the second or phasic reflex pathway results in reactions that are a series of repeated but short lived movements. Hunter and Royle interpreted "plastic tone" as that element which is inhibited during movement and which, in a normal muscle, maintains an attitude against gravity. Tone is a property of muscle, the components of which are today incompletely known, and the physiology of which is poorly understood."

"Sherrington[5] has pointed out that the organism is subject not only to environmental influences which play upon receptor cells at the surface, but is affected also, by stimuli with the organism itself. The name 'proprioceptors' is given by Sherrington to these receptor mechanisms which lie embedded within the deeper tissues, particularly in the muscles, tendons and joints. These mechanisms may be distinguished from the 'exteroceptors,' which lie near the surface of the body, as, for examples, the ear, eye, and skin and are affected by environmental stimuli."

To maintain posture—a normal individual has to a very elaborate machinery.

"The[6] tone of the legs if affected by the labyrinths on both sides. The extensors of the trunk and neck are affected by the labyrinths on the corresponding sides and the body is brought into the normal position largely by the reflex through the neck."

Dr. O. R. Langworthy[7] explains this more in detail. He states: "The sum total of postural reflexes are: (1) optic (retinal righting); (2) labyrinthe righting reflexes; (3) righting reflexes arising on the deep tissues of the body wall and acting on the head; (4) righting reflexes arising on the deep structures of the neck and acting on the trunk and limb muscles; (5) righting reflexes arising in deep muscles of the body wall and acting on the limb and trunk muscles."

Magnus groups the nervous conditions affecting posture as: Labyrinthine, proprioceptive (same as five above), exteroceptive (chiefly pressure—meaning reflexes arising in the atoms on the outside of the body and affecting posture) and influences from the teleoceptors (eye, ear, nose).

The obvious interplay of these reflexes explains why it is impossible to get a movement in one joint without a change in posture. In one spastic, all these are telegraphing messages without limit to one poor individual, who must learn to segregate them for his use.

There are many other influences that are as intimately associated, also. The studies of Sherrington and Liddell on posture and tonus suggest that tonus is *attention*, expressed in neuro-muscular terms. Here we come up against all the multitudinous factors involved in attention. As long as the experimental studies pertinent to reflex and tonic states may still be called elementary, this phase of spacticity remains just that much of the unsolved mystery.

Besides this complication[8] "it is not always easy to estimate how much of the imperfect function of the limb should be attributed to spasm of certain muscles and how much to a want of voluntary initiation of impulses which should be transmitted to their opponents (those in spasm).

Still another obstacle is to determine how much the cerebral control center is at fault. In the normal volitional movements, there must be the delicate balance of muscle tonus in the stretching muscle and the contraction of the working muscle. The inhibitory action of the cerebral control center is the adjustor of the reflexes involved between the muscle groups. Damage to this center results in imperfect function, also.

CHAPTER IV—SYMPTOMS

While we may have no way of discovering what the essential defect is, we do know that a lack of such balance of tonus gives rise to certain symptoms:

1. Loss of muscle control and inco-ordination.

There is an inability to originate and complete movements throughout the whole joint range with a continuity of precision. "The[6] power to flex and extend may be present but can not be called into action by the will of the individual." Depending upon the involvement, this is demonstrated in various ways:

(a) Flaccid paralysis comes from an under-development of the cortical centers. The limb may show a typical spastic contraction and yet the muscles are in a state of hypotonus. "'There[7] seems to be a lack of power to originate the necessary impulses."

(b) Athetosis is peculiar to pyramidal involvement. This takes the form of involuntary, associated, or choreiform movements. The movements are characterized by being slow, constant, and vermicular in form.

(c) Rigidity indicates extra-pyramidal damage. Power of accommodation, both voluntary and reflex, is impaired. There is the appearance of rigidity and fixation of the limb.

(d) Typical spastic movement is the loss of muscle

[4]Davis, Loyal, M.D., and Allen B. Kavanel, M.D., "The Effect of Sympathectomy on Spastic Paralysis of the Extremities." Journal American Medical Association, Vol. 86, 1926.

[5]Fearing, Franklin, "Reflex Action." Williams & Walkins Company, Baltimore, 1930, pp. 268.

[6]O'Connor, J. M., "Physiology of Exercise." Irish Journal of Medical Science, 1928, p. 6.

[7]Langworthy, O. R., "Control of Posture by the Central Nervous System." Physiological Review, Vol. 8, April 1928.

[8]Fairbank, H. A. T., D.S.O., M.S., F.R.C.S., "Treatment of Spastic Paralysis in Children." The British Medical Journal, May 1, '26.

control, which is distinctly demonstrated whenever movement is attempted or stimulated by the sudden spasm of muscular action.

2. Another common symptom is the lack of control over the reflex system.

As stated before, the inhibitory influence has lost power and reflexes have no restriction. Certain reflex reactions are elicited in patients having similar lesions. These vary according to the extent of neural deficiency.

Babinski's reflex test consists of stroking or hitting the sole of the foot. If it is a paralegic paralysis, the crossed leg will extend and plantar flex the foot. If not, the spastic patient will flex hip, knee, dorsi-flex foot, extend toes, and usually hallux.

Ankle clonus is another reflex produced by a sudden pushing up of the foot, with the leg extended. The clonus is a spasm of the calf muscle.

Phillipson's reflex is evidenced by passively extending one flexed knee. This reflex response occurs when the other knee does the same.

The associated reflex reaction means that hypertonus increases with semivoluntary movements, such as yawning, stretching and any forceful sustained voluntary contraction. "These vary in form by reflex influences arising in the labyrinths and proprioceptors of the neck muscles." A change of posture or just head position will increase or decrease amount of hypertonicity.

Then, there are the lengthening and shortening reflexes. They are demonstrated by passively moving a limb into a new attitude. The reflex adaptation of the muscle to the new position occurs and the muscles resume their tonic fixation. Whenever shortened, a muscle resumes a new and shorter length, and maintains it; vice versa.

The postural reflexes are usually exaggerated. These are the ones that excite in the reflex animal, the restoration of its erectness. (Sherrington 1924.) According to Magnus and Kleijn, they are grouped: the standing, and the righting reflexes. Their proprioceptors are most sensitive in the antigravity and neck muscles. These normal reflexes exaggerated will mean hyperaction of the antigravity muscles.

There are many other pertinent elements that probably should be included with the postural reflexes, but there again is a whole field. Certainly the eyes, the otolith organs, and all geotropic reflexes are among the important factors in posture maintenance.

All the above reflexes have been listed because they are so commonly mentioned by the diagnostician and play such an important part in the picture to describe actions and conditions. Their use for diagnostic purposes is the property of the doctor. To the clinician, they will indicate the groups of muscles over-active and are the very keyboard by which to educate neuro-motor control.

3. The third common symptom is impaired mentality.

Even if the damage in the brain has only included the motor areas, the mental development will probably reflect a handicapped physical modality. He is so limited physically that his education is inadequate. The medium of his information and communication is more limited than the average person. A corresponding mental variation is to be anticipated. More extensive cerebral destruction is usually found, however, with the very capacity of intelligence affected. Here we are only brushing the surface of a whole problem belonging to the psychologist.

4. Deformities are usually present in spastic paralysis patients.

They are caused primarily by contractures. They are due to continuous stimulation of one set of muscles with unequal stimulation of the opponents until the latter become permanently stretched and helpless against the stronger leverage.

Dr. C. L. Lowman says: "Permanency of deformity or added deviations are produced by a structural adaptive shortening of ligaments and growth deviations in the skeleton, especially noted in the feet, forearm, hand, and shoulder region."

Explanations have been proffered to account for the typical deformities. One is that the gravity pull produces such contractures. Another states that the muscular equilibrium reverts back to the positions maintained by the early vertebrates: climbing trees, etc.

SUMMARY

Loss of muscle control, inco-ordination, increased reflexes, impaired mentality, and deformities, are the symptoms generally present to some degree in the usual spastic patient.

To complete the picture, let us describe a case as he appears in characteristic positions. These positions are not constant in all cases, but can only embody the typical ones. In the upper extremity, the arm is strongly adducted, internally rotated, and flexed. The elbow, wrist, and fingers are flexed. The forearm is pronated, and the wrist adducted. In the lower extremity, the leg is strongly adducted and internally rotated; the knee and hip flexers over-active; the foot plantar flexed; and the toes flexed. The trunk muscles are usually involved and synergistic. They are also forced to accommodate the trunk position to the leg position: e. g., paraplegic (page 199) position of legs would necessitate a lordotic lumbar spine with muscle tension accordingly. The neck may be turned sideward, backward, or forward, according to reflex stimulation.

The face muscles are frequently included. The neck muscles may contract spasmodically with some corresponding movement of the head. The eyes may blink, and the face may draw into a grimace somewhat similar to an athlete registering extreme fatigue. Many patients drool. This symptom shows an involvement of the vaso-motor area in the cerebellum. Throat muscles, lips, tongue, etc., involvement produce speech faults and often difficulty in swallowing.

In the athetoid spasticity, the movements are the predominating characteristic. The incessant rhythmic contractions lacking voluntary objectives recur constantly.

In separate pictures, we see the straight spastic who increases his flexor, adduction, and internal rotation on attempting any movement. In the flaccid example, perhaps the same deformities are to be seen, but there is no perceptible movement.

Very often there is a skin eruption due to faulty elimination and digestion. The constipation factor will be discussed later. It is a very persistent factor.

According to Holt, the patient at birth is in a state of "stupor, rigidity, increased reflexes, convulsions, paralysis, and opisthatonos" (a tetanic spasm in which the head and heels are bent backward and the body bowed forward). "The[9] nystagmus, contracted, dilated, or unequal pupils, sighing, irregular respiration, and a bulging fontanel, may also be present."

The symptoms have been briefly listed to merely introduce spastic palsy. Any one having had experience with such patients has a more or less vivid picture to view. Then, too, they usually show a marked increase of symptoms at puberty.

[9]Kelley, Samuel W. M.D., "Paralysis of Infancy and Childhood." Pg 407. E. B. Treat & Co., N. Y., 1909. Pp. 393-417.

PART III—TREATMENT

CHAPTER V—ORTHOPAEDIC PROCEDURE

With somewhat of a background, the next question is—what is being done for this patient? He presents a varied problem. The treatment proceeds from all angles.

Dr. C. L. Lowman suggests the following initial examinations: orthopaedic, neurological, psychological, endocrine for organic balance, optical to discover whether or not there is a choked disc, and one from a brain surgeon if evidence of increased intracranial pressure seems likely to exist.

"We are dealing with a totally disturbed organism and the complex situation must be unravelled and proper respect for each element in it be maintained. Teeth, tonsils, sinuses, and the usual portals of infection should be investigated and treated as found necessary."

Fatigue toxins increase the excitability of an already nervous state.

With this to indicate the comprehensiveness of the treatment, we will try to discover the contribution of each expert to the development of the spastic patient as a whole.

Primarily, the spastic is an orthopaedic and neurological patient. If muscle unbalance and contractures are present, these must be overcome before much education is possible.

The treatment begins with the infant.

"If" symptoms of spacticity are noted, Sharp and MacClaire advocate lumbar punctures. If the cerebral spinal fluid is blood, punctures should be repeated to draw off the cerebral hemorrhage and thus lessen the extent of the hemorrhage."

"The[11] coagulation time and bleeding time should be determined in every new born, presenting unusual symptoms, or better as a matter of routine. If reactions are delayed, blood should be administered."

"Transfusion[12] is essential in all cases where the constitutional symptoms are severe" or "if the coagulation time is increased."

These seem to be the most successful methods of treatment for the infant.

Following this age, the spastic usually receives general medical, physiotherapy, occupational therapy, and orthopaedic care.

The orthopaedic procedures depend on the underlying theories (already presented) the individual surgeon has adapted.

Prior to the age suitable for operative procedures, many use brace, cast, or splint to keep the strong muscle groups controlled or stretched. This is more commonly done to the legs. The explanation is that such measures prevent deformities, lessen the static strain of synergistic muscles, and reduce the fatigue toxaemia by resting the hyperactive limbs.

Braces are used not only as a means to avoid contractures, but also to help control the instability and imbalance, due to these intense reactions caused by a whole system of unrestricted reflexes. One theory will support the opinion that, for instance, in a quadriplegia, limiting the surging reflexes by bracing the legs, may result in a much speedier and more satisfactory control of the arms, lessen the drooling, and improve the speech. Some support the belief that the learning process to control the spastic muscles is slowed up by bracing.

The fundamental approach makes quite a variation in the treatment of these cases.

The operations vary for the same reason. Operations may be done as early as from 3 to 6 years. They depend upon the type of spasticity, mental equipment, physiological condition, and the judgment of the surgeon.

Dr. James Collier states: "That operations are hardly worth while when involuntary movements are a prominent symptom."

The I. Q., however, often rises following operative steps and therapeutic treatment.

The operations to try to relieve the patient are numerous: Ramisectomy, neurectomy, tenotomy, tendon transplant, myotomy, tendon lengthening, resection of portions of tendons and muscles, fasciotomy, decompression, Souter's operation, and stabilization of the tarsal joints.

The most recently promoted operation is the sympathetic ramisection of Dr. Royle and Hunter. It is based upon the hypothesis[13] that the functions of movement and posture are performed by entirely different sets of muscle fibers—that the movement fibers are supplied by the ordinary spinal nerves and the postural fibers by the sympathetic nerves. The operation consists of severing the rami to the sympathetic trunks, or including the ganglion and the whole sympathetic branch. The following quotations express the common findings of those who have done this operation: "Kymographic[14] tracing of tendon reflex, faradic stimulation, active and passive motions and tremors before and after removal of the sympathetic nerve supply, have shown no change in cases of paralysis agitans, post encephalitic, Parkinson's disease, system degenerations of the spinal cord, traumatic lesions of the spinal cord, cerebral hemiplegia, and Little's disease." "Calorimetric[15] studies demonstrate marked heat production increase and heat radiation—no sweating."

Stoffel's operation is based on the theory that partly dividing the nerve supply to the overacting muscle or group of muscles, would have two results: First, cutting down the number of afferent and efferent impulses between the muscle and the spinal cord; second, the paralyzing of parts of these muscles, leaving the unparalyzed parts still spastic.

Such spasticity, however, should be without effect, as the weakened muscle would no longer be strong enough to overcome the antagonist, and thus the contractures would disappear.

The procedure is to dissect out the nerves to the spastic muscles, isolate by using an electrode, divide half of the nerve, test again, etc., until the contraction is the desired strength. In the upper extremity, the median to the pronator teres is usually sought. In the lower, the anterior and posterior ramus of the obturator is taken for an adductor contraction. He resects the sciatic which supplies the internal hamstrings, if the knees are flexed, and the internal popliteal supplying the soleus and gastrocnemius to overcome foot extension.

Concerning its results, Dr. F. D. Dickson states: "Spasticity[16] in other parts lessens; speech improves;

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[11]Dickson, Frank D., M.D., "Treatment of Cerebral Spastic Paralysis with Special Reference to the Stoffel Operation." Journal, American Medical Association, Oct. 18, 1924.

[12]Rodda, F. C., "Coagulation time of blood in the New Born." Journal, American Medical Association, Aug. 14, 1920.

[13]Beveridge, Ruby S., L.R.C.P., M.R.C.S., "Haemorrhagic Disease of the New Born." Archives of Diseases of Children, Sept. 28, 1929.

[14]Bankart, A. S. Blundell, M.Ch., F.R.C.S., "Sections on Orthopaedics and Diseases of Children." The British Medical Journal, 1: 776-9, May 1, 1926.

[15]Davis, Loyal, M.D., and Allen B. Kavanel, M.D., "The Effect of Sympathectomy on Spastic Paralysis of the Extremities." Journal American Medical Association, 1926, Vol. 86.

[16]Brown, George E., M.D., and Alfred W. Adson, M.D., "Calorimetric Studies of the Extremities Following Lumbar Sympathetic Ramisection and Ganglionectomy." American Journal Med. Sc., Aug., 1925, No. II, Vol. CLXX, p. 232.

[16]Dickson, Frank D., M.D., "Treatment of Cerebral Spastic Paralysis—Special Reference to the Stoffel Operation." Journal American Medical Association, Oct. 18, 1924.

there results better co-ordination and definite improvement in the general condition. This last is probably due to the quieting effect of the operation on the complex reflexes through which the correlation of activities in widely separated parts of the body take place."

Transplantation of muscles is frequently done. However, a spastic muscle transplanted is still spastic. The common operations transplant the biceps to the patella, extensor proprius hallicus to the head of first metatarsal, and wrist flexors and extensors inserted in to the extensors of thumb and fingers.

The Souter operation consists of lowering down the anterior superior spine of the ilium with muscle and fascia attachments intact.

Foerster cuts the sensory nerve just before it enters the spinal cord—and does an intradural resection of the posterior spinal nerve roots or rhizotomy. This is a very successful operation on spasticity, but the mortality is high.

"Tendotomies" are done to adductors and heel tendons. Heel cords are frequently lengthened."

According to Dr. C. L. Lowman, plastic lengthening should always be done to heel cords instead of tenotomies. He also suggests: "Wrist arthrodesis in extended position as done by Sir Robert Jones, together with transplantation of wrist flexors."

Dr. S. F. Steward "Prefers to stretch cords in a properly designed cast. This procedure of gently and passive stretching may be called the Weir Mitchell treatment."

Operations are always followed by casts which are kept on from two to ten weeks, according to the surgeon.

CHAPTER VI—CORRELATION OF TREATMENTS

Limited in activity, constantly in state of toxaenemia from fatigue, undergoing extreme tension, we look to his medical and glandular needs to aid in his general development.

"The" acidity usually found should be regulated by a carefully watched alkaline diet and an avoidance of rich or stimulating foods."

"Improved bowel function follows the use of some such combination as pituitary extract and thymus and, is some cases, the addition of thyroid. The improved condition of the nails, skin, and teeth result. In some cases, the early modification of drooling and incontinence of urine is especially noticed in a very short time."

"Pituitary" gland extract up to 15 gr. daily is sometimes given."

Holt gives thyroid extract is small dosage during the first years of life. Parathyroid is given as a sedative to the sympathetic nervous system. Chloretone acts as a sedative to muscle tension. Luminal is sometimes used, but not over as long periods.

This therapy is based on the theory that in certain cases, the pituitary gland is involved in the hemorrhage and its function interfered with. Patients who seemingly had marked mental impairment and lacked ability to make any physical effort, were most benefited.

Dr. C. L. Lowman pictures it: "The spastic child has poor breath control and suffers from under oxidation, with its resulting air hunger, alkaline lack, and lowered threshold of receptivity to sensory impression, fatigue toxaemias, and his over-acting muscle toxaemias."

There are many fields which must contribute to the development and education of this type of case. The orthopaedist takes many factors into consideration before he outlines the treatment and he must know the possibilities in each factor. It continues to be his responsibility to arrange the combination of treatments which seem most important. There should be a rounded out program with the essential aspect emphasized and yet all branches contributing at their most appropriate contribution period in the patient's development.

Before delving into the physiotherapy end, let us emphasize the fact that each of these has a very important contribution: Psychologist, speech expert, oculist, neurologist, and internist.

The psychologist will give the patient's capacity for learning, the idiocyncrasies, the special interests and abilities, and a suggestive procedure for further development mentally. Another great advantage is that he is able to check up scientifically, the amount of intellectual improvement following treatment. His problem is a very difficult one, though, because the patient can not move with accuracy, and often can not talk, and suitable tests are scarce.

The speech expert is vitally important. The facial muscle control—so often damaged—is strictly his domain. His is a very close contact with the natural expression of the child's personality.

The oculist's care is also important. The eyes are part of the postural guides affecting the entire body. Fatigue and fretfulness are displayed so quickly when an eye strain or faulty vision is an added handicap.

To the internist, the orthopaedist looks for endocrine and general medical treatment. It is certainly important that the engine running this individual be kept in the best possible condition. The impossibility to live normally makes this doubly important.

The neurologist determines the exact pathology and gives the information concerning the nervous mechanism, in which the contributing factors may build.

The orthopaedic surgeon prescribes the educative procedure. This includes, usually, the occupational therapy and physiotherapy beside any of the aforementioned. Perhaps the patient will get six months of speech training with physiotherapy, then change to occupational therapy as the need arises, to keep the development well rounded out.

Orthopaedic Hospital School, Los Angeles, Calif.

(To be continued.)

[17](Op. Cit.) Dickson, Frank D., M.D., "Treatment of Cerebral Spastic Paralysis—Special Reference to the Stoffel Operation."

[18]Lowman, C. L., M.D., "Spastic Paralysis in Children." Medical Life. Vol. 29. No. II. February, 1922.

[19]Simon, M.D., "The Treatment of Spastic Paralysis by the Stoffel Operation." New Orleans Medical & Surgical Journal. Vol. 80:622-27. April, '28.

A Case of Beriberi

By Charlotte H. Ballard

Given as a lecture with illustrative movies before the Northern California Chapter of A. P. A., May, 1931, at regular meeting

A case of Beriberi is of special interest to the physiotherapy technician because of the rarity of the disease in this country and because of the gratifying progress the patient makes while undergoing treatment. In this particular case definite improvement could be noted at every treatment, so the technician was not called upon to bolster up her own enthusiasm nor the morale of the patient over a long drawn out period usual to peripheral nerve disturbances. Moving pictures were taken of this patient at various stages of his convalescence from the time of hospitalization until ready for discharge from regular treatment. This paper in no way will attempt to give a detailed account of treatment, but will try to present pictures to you of this patient's record of progress, as did the films, which were shown to you at the last convention.

To most of us Beriberi means vaguely a disease of the Orient caused by unhygienic living conditions and poor food, and usually fatal. To bring the problem more clearly to mind, I quote to you a short summary of the disease and history of this particular case by Dr. Jau Don Ball.

"Beriberi is probably the oldest of the deficiency diseases. It is characterized by peripheral neuritis, edema, myocardial weakness, and enlargement of the heart. Reference is made to the disease in very ancient Chinese and Japanese manuscripts. It is endemic in Japan, China, the Straits Settlements, the Dutch East Indies and the Philippines. Sporadic cases appear in Europe and North America.

It has been proven that Beriberi is a food deficiency disease, especially Vitamin B. This substance (Vitamin B) is concentrated in the outer layers of cereals that are used for food—rice especially—by the native populations of large portions of the tropical and subtropical countries. This substance (Vitamin B) is removed by modern milling processes. Therefore, people who subsist largely upon unpolished rice suffer from deprivation of Vitamin B—and are likely to develop Beriberi.

Rice eating alone does not necessarily produce the disease. It follows also upon a prolonged period of monotonous eating of other completely milled cereals, or such a diet as white bread, molasses, sugar, and fats.

The prevention of Beriberi is entirely dietary. The treatment is dietary plus concentrated Vitamin B, now available, rest in bed, medication for cardiac condition, elimination by bowels, kidneys, and skin.

Physiotherapy is of greatest importance as a part of the treatment—as demonstrated in this case.

Case. A Chinese boy, sixteen years old, six months from China, confined at the immigration station, Angel Isand fifty days. Diet—polished rice, one egg daily, sweet crackers, Chinese cabbage. He ordinarily ate little but rice.

In July, 1930, noticed that both feet began to swell. The swelling disappeared after two weeks, and the patient noticed weakness in feet and ankles—"drop foot." Could use his hands, but within two weeks after feet became weak he could not use hands—"drop wrist."

At no time did he have pain.

Paralysis came on gradually. There was a peripheral neuritis affecting other muscles of the body as well as the muscles of the legs and forearms. Especially the muscles of the back and neck were affected, so that he could not hold up his head.

Patient came under my treatment in September, 1930. He has steadily improved under diet, baths, and rest, and since he has been under physiotherapy treatment the progress has been very rapid.—Dr. Jau Don Ball.

C. L. was first admitted to the Chinese Hospital suspected of having Infantile Paralysis, but because of his peculiar symptoms was referred to Dr. Ball for diagnosis and treatment. After a month of hospital care of the type indicated above, Dr. Ball sent him to this department for physiotherapy treatment, with orders for electrical stimulation, massage, and exercise, particularly of the extensor muscles of the hands and feet, and caution against any over stimulation of heart action.

When C. L. reported for his first treament, October 1, 1930, he presented a sorry looking picture. He was still a patient at the Chinese Hospital where his diet, rest, medication, and elimination were supervised. He came in with two attendants, an interpreter and a body guard. He was thin, weak and unsteady as to gait. In walking, it was necessary to assist him or allow him to hold to various pieces of furniture to keep his balance. He either shuffled his feet, or lifted his knees high allowing his feet to flop in typical "drop foot" fashion. He was unable to undress himself, he tired very easily, and his pulse was rapid and not too regular.

On examination of the arms, the atrophy of the hands was very noticeable, involving all muscles and extending half way up the forearms. The extensor muscles were very weak, but he was able to extend the wrists against gravity with the fingers flexed. Extensors of the finger were very feeble, also he was unable to spread the fingers and thumb. The muscles of elbow and shoulder joints were not involved.

Inspection of the legs showed much less atrophy of the feet than hands, but there was no muscle tone. The muscles felt flabby and doughy to the touch and there was a decided toe drop of both feet. There was

no apparent active motion of feet or toes in any direction.

The extensors of hands and feet responded feebly to electrical stimulation, but only to interrupted positive galvanism, the hands slightly better than the feet.

The hamstring muscles were very tight,—lying on the back, the knees were somewhat flexed and the patient was unable to sit up with knees completely extended. The abdominal, back, and neck muscles were weak but capable of active motion, although in the lying position the head could be lifted neither in flexion nor extension.

Exercises for this patient were very carefully graduated, and interspersed with frequent rest periods to prevent any heart reaction. Massage, and muscle re-education of the hands and feet with mild galvanic stimulation was begun. As the heart action improved, arm, leg, abdominal, and back exercises were added, through the lying, sitting, and standing positions. Electrical stimulation advanced from positive galvanism to negative, to slow sinusoidal to surgeing, and to faradic. The course of treatment extended over a period of about eight months.

The next film of C. L. was taken sometime in December after about two months of physiotherapy treatment. The picture showed a remarkable change. He was no longer at the Hospital, he had gained weight, he walked by himself, and undressed himself. His hands were still atrophied but he had developed a surprising degree of strength and was able to extend wrists and fingers forceably against resistance. The extensor muscles responded nicely to surgeing sinusoidal current and he was beginning to use his hands at home in writing, painting, and other occupations demanding good muscle co-ordination. His neck, back, and arm muscles had reached the stage where he was able to do vigorous exercises with one pound dumb-bells in the sitting position. The feet had not progressed so rapidly; first, because he could not be persuaded to part with his Chinese slippers; and, second, because he did not grasp the importance of supporting and keeping his feet in a proper position when not under direct supervision. However, he had regained active motion of the feet in flexion, extension, inversion, and eversion, although not against resistance. General leg and abdominal exercises were done very well in the lying position, and the extensor muscles were beginning to respond to slow sinusoidal.

During the next two months C. L.'s progress was very rapid, due to his general physical improvement and to a psychological factor, which may be well to mention. About this time he was taken to visit friends in San Jose, and in honor of the occasion was outfitted in the latest American clothes, including proper shoes. He developed a great pride in his personal appearance and his gait changed from a characteristic Chinese shuffle to almost a swagger. He learned to button his shirt, tie his tie and shoe strings with exactness and began to make an effort to speak English. At the end of this time he entered school, and began coming for treatments on Saturday mornings by himself. By this time his exercises were of a more general nature, including standing, walking, and balance work.

The last film taken of this boy was on May 23, 1931. Now, all massage and electrical stimulation had been discontinued and his treatment consisted chiefly of posture exercises and general gymnastics of an active type, including trunk bendings, running, jumping, etc. His general physical development is now as good as any non-athletic boy of his age. His hands still show signs of atrophy but he can easily extend his wrists holding a five pound dumb-bell. His feet are flat. I have an idea that they always were flat, and probably always will be flat, unless he is supervised constantly for some time to come in foot exercises. At present he reports occasionally to Dr. Ball and to this office for supervision and a check up on his physical condition and home hygiene.

San Francisco, California.

Why Educate the Crippled Child?

By Miss Carrie Daly, Principal, Sunshine School, San Francisco, Calif.

Read before Section on the Exceptional Child World Conference for Education, Denver

"President Hoover's White House Conference on Child Health and Protection, recognizing the rights of the child as the first rights of citizenship, pledges itself to these aims for the children of America:

"For every child who is blind, deaf, crippled or otherwise physically handicapped and for the child who is mentally handicapped, such measures as will early discover and diagnose his handicaps, provide care and treatment, and so train him that he may become an asset to society rather than a liability. Expenses of these services should be met and borne publicly where they cannot be privately met.

"For every child these rights, regardless of race, or color, or situation, wherever he may live under the protection of the American Flag."

With this as our ideal, why *not* educate the crippled child? He is a potential citizen, a real person in this world of ours, and whatever his handicap, no one of us can foresee what medicine or surgery may be able to do to improve his condition in another decade or two. If he is educated while still incapacitated by paralysis or disease, how much greater will be his earning power when he is partially or entirely made whole! This is the economic reason for educating the crippled child.

In the ten years that I have worked with handicapped children, I have seen boys and girls who, a decade ago, were said to be beyond any help from medicine or surgery. Today these children are being operated on and therapeutically treated, and sent back to us entirely or partially rehabilitated. Are they not less of an economic problem now than if they had been left uneducated?

To make him a "social asset rather than a liability," the crippled child is entitled to an education. These children are, as has been said, potential citizens, and while they live will be part of the mass of voters. They cannot be expected to be happy and contented and worthwhile citizens when they know that they have been denied that which their normal brothers have had, an education.

Social contact is the one thing that the crippled child needs to keep him from becoming an anti-social individual. As a result of his handicap, the crippled child instinctively builds up a wall,—what the psychologist calls a defense mechanism—to protect himself against his inability to keep up with his normal brother. Society has only one remedy to offer for this complex,—a contact with other children with similar handicaps, and a natural competition with others in natural school situations.

Knowing that the crippled child must be educated to meet these two needs, San Francisco has established the Sunshine School for crippled children. The aims and purposes of this school are to give every handicapped child the best education it is possible for him to assimilate, to win for him the best physical condition it is possible for him to attain, and to help him to find his place in the world's work.

The children of the Sunshine School are all mentally normal or above, as is evidenced by their rate of progress, which is virtually the same as that of physically normal children of the same age. This does not mean that every child in the Sunshine School rates a high I. Q. At first some of them do not, for the child crippled from birth, or one who has spent many years in a hospital bed, does not have the contacts or background that give the well child what we call normal reactions. Consequently, a child—when there is a possibility that his test has been low because of these handicaps—is given a year in the school and then is again tested. In my judgment many crippled children who are called dull or low mentally are retarded only because of lack of social contacts. These we try to give him in this school.

Our school day begins at eight twenty-five when the first group of children arrives. Classroom work is closed for the day at three in the afternoon with the departure of the last group for their homes. The children are transported by taxi cabs, the Board of Education making appropriation to cover the cost. We are now using eleven cabs, carrying 116 children. The cabs travel 320 miles per day at an average cost of 55 cents per pupil. Our drivers are all reliable family men, and some of them have been with us since the school opened.

Our school program in general is the same as that of the regular school, though it is modified in some instances, and includes special activities for many of the children. Manual training and sewing are offered for the older children. Woodwork and toy-making give skill in using crippled hands and train minds which are not as alert as they might be in academic subjects, but which are very quick in setting up a pattern for a table or a toy or in designing a piece of furniture.

Music and dramatics are subjects that the children love because they give expression to those feelings that have been cooped up in them for so many months or years. They are perfectly unconscious of their handicaps when they are reproducing in song or drama the world as it appears to them. Costumes are made for every play and much planning is necessary to make a dress that will cover up braces or casts so that the Queen will be really beautiful. Life is wonderful when they are planning these affairs, and certainly to hear them sing makes one forget that their lot has been sad or painful. This is one answer to the question "Why Educate the Crippled Child?" A happy child makes a more useful citizen.

Play and recreation form a large part of our curriculum. Games and physical activities are modified or adapted to meet individual or group needs, since training begun by the physiotherapist must also be used in the

classrooms during lesson periods. No physiotherapy treatment is given to any child until the cooperation of the home is solicited and the consent and prescription of the physician or clinic in charge of the case has been obtained. Every teacher in this school joins the physiotherapist in this effort, since one of the aims of the school is to aid in physical restoration of the child. The Board of Health through our school physician keeps a check on the physical condition of the children and cooperates with the pupil's own doctor, so that there are no misunderstandings as to the care given the children in school.

The child's restoration to as nearly normal training as possible is another aim of the school. In every way the physique is built up and health habits are instilled. Each child has his own cot and blanket and spends at least one hour out of the school day resting in the open air. Children who have been in the school a few months or longer miss the rest period if it is omitted, and new pupils who may at first object to it soon become accustomed to this régime. This period gives tired bodies a chance to catch up with active brains. Mid-morning milk and a hot lunch at noon aid in this physical restoration.

To preserve normal mental abilities, the academic objectives are kept as nearly as possible identical with those in the regular public schools. When a child has adjusted himself to the group, or has overcome his physical handicap to the degree that the regular school is the proper place for him, he is transferred to a regular school most suited to his needs. Only a few cases have occurred wherein the pupil has been required to return to Sunshine, and some of these resulted from additional surgical work.

Teaching at Sunshine is really an individual process, since many of the children who enter have been out of school for many months or years, or have never been in school, but an effort is made to group them as soon as possible, because socialization and school adjustment are most important. When the children find that they can keep the pace that other children have set, and withstand the strain of keeping up, both physically and mentally, with a large group, they react quickly to the atmosphere of the school and become happy and contented. This adaptation to the group is most important, since the crippled child has been given so much special attention and consideration in the years when suffering was his lot.

The children are encouraged to do all they can for themselves and for others. They are trained away from feelings of self-pity to those of hopefulness and cheerfulness. In fact, pity is never expressed in the Sunshine School, as it is a positive menace to physical, mental and social advancement. With increasing health comes the feeling of responsibility to make good, and this attitude toward work and play and toward the ideal of what the child would like to become forms character, out of which will develop useful citizenship.

I have purposely given a somewhat detailed account of the activities of the Sunshine School of San Francisco, since I am convinced that the additional happiness and usefulness of the children who have gone from this school to take places among their normal fellow students in other schools or in industrial positions make a satisfactory answer to the question, "Why educate the crippled child?"

Cases of Drainage Treated in the Salt Water Pool

By Estelle Martin

The salt pool of the Orthopaedic Hospital School is one of our three specially constructed tile pools. It is located out of doors and has its own filtering and sterilizing systems.

The pool is ten feet wide, eleven feet long and two feet nine inches high. It contains 2100 gallons of water, 500 pounds of rock salt and 200 pounds of epsom salt.

Temperature of the water is kept at ninety-four degrees. Samples of the water are taken to the laboratory for analysis four times a week. No secondary infection has occurred although various types of draining sinuses are placed in the pool. An hour is allowed to elapse between treatments to give the water time to chlorinate.

The patients are brought from their beds on guerneys which are covered with sterile sheets, and then lowered into the water by the over head trolley with electric carriage.

Following is a report of three types of cases that have been given salt water treatments.

CASE I—DIAGNOSIS, SUPPURATIVE ARTHRITIS

At the age of 7, a Japanese boy was brought to the hospital. His right knee was very tender, hot with marked increase in fluid. He was taken to surgery for incision and drainage. Fifty cc's of pus were obtained, which showed white cells, staphylococci and streptococci. The Willems' treatment was started but no headway was made because of extreme pain and tenderness.

Five days after surgery he was taken for daily treatments in the salt pool. Dressings were left on the wounds until saturated and then were removed without pain. The boy enjoyed sitting and playing in the water and when told to bend his knee he did without pain. Active flexion was encouraged to increase drainage. Drainage was excessive.

After twenty-seven treatments—wounds were healed, contour of knee was normal and patient had ninety degrees active flexion. He was walking (without crutches) with a slight limp, which possibly was due to apprehension. Boy was discharged with instructions to continue exercises at home.

CASE II

Boy, age 16, came to the Orthopaedic Hospital School with a diagnosis of chronic ulceration of left knee. After three skin grafts, ulcers were healed. Patient returned after absence of seven months. He had bumped his knee and wounds reopened. His temperature was 104°. Another sore appeared on upper end of the medial aspect of leg, which resembled a carbuncle. There was swelling over the leg, particularly on medial aspect from the knee to the anke. There was local heat and extreme tenderness.

Patient was admitted to the hospital for incision and drainage. At surgery the skin was undermined for the distance of seven inches down the inside of leg. Skin over this area was laid wide open and packed with vaseline gauze.

Ten days after surgery there continued to be a moderate amount of drainage and very little granulated tissue was present.

Boy was put in salt pool daily. After twelve treatments drainage had ceased and the wound had filled in with very healthy looking granulated tissue. Wound was strapped with adhesive tape and dry dressings applied.

Five weeks after incision and drainage the wound was closed.

CASE III

Little girl, age 3, without known injury or illness, began to have a decided limp on right side.

X-ray showed a low grade of osteomyelitis involving the neck of the femur.

Child was placed in single spica. In spite of fixation in cast lesion progressed. Osteotomy of neck of femur was performed. Wound was packed with vaseline gauze. Patient was kept in casts for ten months. Upon removal of last cast—a small sinus was draining.

Salt water treatments were given three times a week. After two months of treatment—patient had normal motion in hip and drainage was very slight. X-ray showed excellent healing progress of neck of femur.

Orthopaedic Hospital School, Los Angeles, Calif.

Overcoming Postural Handicaps

By Doris I. Neel

Adapted from Miss Neel's delightfully illustrated manual for mothers of growing children

YOUR CHILDREN

You have heard Mrs. Smith say, "I don't know what to do with Mary—just look at the way she stands, and she is that way all the time now. Why, when she was a baby she was just as straight—you wouldn't believe!"

And you, looking at Mary "wouldn't believe," for there she is: long, thin, angular—no curves at seven whatever she may have had as a baby. And thin as she is, Mary seems to run to "tummy." You see her as she steps, one long leg after the other, into the bath tub and immediately you think of the twins at home and commence telling Mrs. Smith how your boys are awfully thin and round-shouldered, too, but you always thought little boys were that way and would grow out of it in time.

That young couple in the brand new bungalow, with the fairly new Ford Coupe, decided to call their newest of all possessions "John" because it is such an honorable and upright name.

And so, in California sunshine, John grew. Then one day, blushingly, because she saw a resemblance to the long, bowed shanks of his daddy, the little mother ventured a question. "Albert, dear, do you, 'er—have you noticed anything queer about Baby's legs?"

GOOD POSTURE.
Figure 1.

"Albert dear" was visibly shocked. Why, hadn't the finest baby doctor in town said that John was perfect? But that, of course, was several months ago. John was commencing to try to walk a few steps now and he was pretty fat for his legs. Together, they stood by the new, white crib and inspected the limbs of their sleeping first-born. Yes, it was true—they were a funny shape. Fancy their John growing up like burly, old Mike who regulated traffic on Broadway. Mike was a fine policeman from his waist up, but through his two curved lower extremities could be seen the traffic on Broadway for blocks!

And so it goes—round-shouldered Mary, the undernourished twins who had the most expensive of foods, Baby John with the funny legs and all the other Marys, Johns and Jimmies with forward heads and round shoulders; big, prominent abdomens; legs that are bowed or knees that are knocked; feet that turn out or in—and the big question—"What shall we do?"

Mrs. Callahan up in the hills says she has "six children by my first husband." When little Pat was ill she took him to the doctor. Pat's ailment was easy to cope with but the doctor noticed something for which Mrs. Callahan did not consider consultation necessary. Having her attention called to sharp, prominent little shoulder blades, a narrow chest and depressed breast-bones, she exclaimed, "Shure, an' it's quite true. Oi've noticed it meself! But his poor, dear feyther had it and indade, sorr, I do be thinkin' the darlint will have to be stayin' that way for it's a family thrait, ye see."

And right here is matter worthy of consideration, whether you be an afternoon-bridge-playing mother with very little time to give personal attention to the wants of your children, or a Mrs. Callahan who takes in washing and sees a doctor when her Pat runs a fever. Need your little boy have knock knees just because your husband has them? Need your little girl have a narrow chest and ugly bones sticking out where a well-built child has fat pads, just because you, yourself, were a thin, ungainly little person? No, she need not—and it is an unkindness and an injustice to the children of this day and age to let such things go uncorrected.

There is the question of expense. Perhaps your little boy's father is a man on a salary and everything in the house, even the house, itself, is being paid for by the month. There is less expense attached to keeping your boy well than there is in getting him well after sickness.

In every city there are well-baby doctors for those who can pay something and well-baby clinics for those who can not. Make sure that the child's weight is correct for his corresponding type (a child should not lose weight because he is growing tall), then note if his bony

prominences appear to be in the normal position. If there are structural deformities, you should be referred to an orthopaedic doctor. But we are thinking now of the fairly normal child—for instance, we will consider those twins.

Upon examination, we find they both have forward heads; their shoulder blades are prominent because they have round shoulders; and their hands, instead of hanging at the sides, are inclined to the front. The smaller of the twins has what is spoken of as a funnel chest—a depression of the breast-bone. He also has a contracted chest. The other boy has similar round shoulders with the left one much higher than the right. You also have noticed that one hip seemed fuller and more rounded out than the other, but didn't know what made it so. Both boys have knock knees and once a shoemaker told you that their ankles tipped in, sometimes called pronation. You have wondered ever since what he meant. Always, you thought that their feet did not look just right and you decided they had weak ankles. Once, three years ago, when James had a fall off his pony, you took him to an orthopaedic surgeon who told you that the boy had a lateral spinal curvature, but nothing was organicly wrong with his spine. Vaguely, you have worried about that.

Well, with all these faults your boys are known as strong, normal boys. They should not turn out their feet when they walk, and their posture is dreadful. It really couldn't be worse. They both are underweight and they both have lateral curves; lots of children have. Those curves will straighten out as you improve their postural habits.

Be sure your doctor is the best man in your town for your children. If he has known the children since they were born, so much the better. Let him size up those boys and see if they are up to par. He will tell you about their rest, their meals, their baths, their clothes and their need of exercise. Their general hygiene and nutrition being taken care of, you should now look after body position and corrective exercise.

YOUR RESPONSIBILITY

The public schools and some of the private institutions are making a brave effort along corrective lines. This is especially true of the last few years. But, at best, they are working with children of Junior High School age and older, who must be given exercises fully clothed. That can never be ideal for correction. The little one of three or five years is never given corrective work, in any case. It is at one year that correction should some times be started. Bow legs and knock knees can be straightened at six months and younger.

This little book is written especially for mothers. If you mothers want your children robust and strong and straight, it is up to you, yourselves, to see that the correction is carried out. I care not at all how much money you have for nurses, governesses and hired help. No one else will take the interest or have the understanding that you will have if you care to devote yourself to the purpose of a cure that will last. And it is the doing of corrective exercises—not once or twice a week, but *every single day at a set time that gains definite results.*

If you send your child to a gymnasium, or have a physical director give him corrective exercises at home, do not make that your chance to slip out and chat with a neighbor, or to do your shopping for supper. Your son is getting his exercises all right, but, if he is only a wee fellow, you are putting too much responsibility upon his little, round shoulders, if you expect him to remember all the sequence and detail of the exercise prescription.

Some instructors say that they do not want a mother in the room when they are teaching a child because the mother always interrupts and the child does not show off to advantage. If the instructor has the child to teach every day, the mother need not be present, of course. But if he has a lesson only once or twice a week, certainly the mother must be there. She must learn to read her own child's body and recognize his needs.

One more point I want to bring out before we get down to specific exercises. Do not let the work grow irksome. It need not be. It is your disposition that reflects upon the child. "Jack, remember, now, you have to do your exercises every day whether you like them or not, so get started"—will never accomplish as much as—"Time for exercises, Jack. My, but you are getting big. You'll be strong as Daddy soon!"

For very little children the spirit of play works wonders. I have in mind one little boy who is a high-powered auto climbing mountains when he mounts the exercise table and a little girl who does certain exercises playing she is a butterfly.

Little girls have as much, and I sometimes think more, pride than little boys about body position. Their dispositions, on the whole, are inclined to be less sloppy.

Names count for a good deal in exercises; therefore, we have the "bow-wow," the "aeroplane," the "wall creep," the "dizzy-toes" and many such.

Above all, do not imagine that the doctor found a lot more wrong with your child than he actually told you. Because he said that he wanted him to have codliver oil, do not look him over at bed-time and decide that he thought that your child had rickets. The doctor will tell you just what he means. Try to get his meaning and use it for your guidance.

CORRECTION PLUS ENCOURAGEMENT.

POOR POSTURE.
Figure 2.

The above illustration is not exaggerated as to type. The child is a little undernourished daughter of the rich. She has had, since birth, much of this world's goods.

Her physical structure is extremely poor. She has seldom been ill, but she is pampered and soft. With

food in abundance, she never has had sufficient nourishment. She has picked and chosen; left a little on her plate at each meal. She has heard that it is natural that she is a small eater. "Her father, as a little boy, was just the same." She has not been made to take naps in the afternoon. She has heard it said that "if she did, she would not sleep at night." In all respects, this little girl has lived up to her reputation. She also has "Mother's hollow back and bow legs" and "Daddy's high shoulder." If such things were impossible to correct, how would the grand-children of this child pan out?

The average child is very plastic and open to suggestion; eating and sleeping, exercise and baths soon become matters of habit. An excitable, highly-strung mother who says, before her children, that "I never could stand cold water" and that "I never react after it" can hardly expect her boys and girls to stand for it, either. The same, of course, is true of eating, of all matters of general hygiene and daily living. The mother who quietly makes it clear that her little girl must eat in a room by herself because she does not eat properly everything that is put before her at the family table will more easily accomplish results than the mother who nags and talks before her child to other members of the family about what a "dreadful time I have trying to make my child eat."

And the above brings us to a word of explanation as to the method to be used in giving work in the day's orders.

Expect good results. Encourage, rather than nag the child. Remember the names of the exercises and let something of the spirit of play come into the work. Sometimes the father or mother should do some of the exercises, also. That, in itself, is interesting. Dwell rather on the improvement the child is making and is going to make, than on the deviations and faults that have to be corrected.

FIRST DAY'S ORDER.

There is a little book, well known to many doctors and teachers of physical education, called "Body Mechanics and Health."* I believe it to be true that Dr. Joel Goldthwait has done more than anyone else to bring forward the necessity of body mechanics and good, sound development of the torso, thus proving, as he says, that arm and leg exercises are often greatly over-rated. It is with gratitude to Dr. Goldthwait that many of us have learned to recognize the importance of a well-functioning diaphragm.

Much can be accomplished with a child in the "rest position." Take, for instance, the little girl in Fig. 2. If you could feel her ribs in front, you would find the angle of ribs and breast-bone, the sub-costal angle, to be much too small, or perhaps closed altogether. Her shoulders are round and her chest contracted.

"Rest Position": With bath towel or sand bag under the shoulders have the child rest for five minutes. The knees are flexed upward so that the inclination to hollow the back is not increased. It is easy to see what this position does for the angle in front. Tell very little children that they are "lying in this position to make a nice, big wish-bone in front." Let them feel for themselves. One mother of a small boy used to let him wish bigger as his angle, or so-called wish-bone, increased in width. Incidentally, the child's father had always wanted to give his son a pony but the little boy had not been strong enough to ride. Of course, when the angle was at its best and as satisfactory to us, he had his biggest wish—a pony! I do not mean to suggest that a pony always be forthcoming, but the psychology of the thing is there. An otherwise uninteresting ordeal is given a thrill. They soon grow very proud of the angle as it opens; and it will open in a week to three weeks' time.

If a child's arms are too contracted to reach back and hold the table corners, they can be urged gently down with pressure. This will tend to overcome the shortened muscles of the chest.

I mention this position first because, although we usually give it after exercises when a child is well started, it is sometimes best to commence with the gradual, passive stretching before giving any active exercises.

POSITION I: Lying flat on back.

EXERCISE 1: Place the sand bag or weight (a dictionary will do) on the child's abdomen. Teach him to breathe in, lifting up with the abdominal muscles. Let him breathe out and pull down *hard*. He goes up only in order to contract strongly. Tell a child to "let no daylight in under your back." Remember, that very small children can be taught any of these exercises. Play that your finger is a creeping mouse and try to get into the hole under the back. Teach the child to push down hard and not let the mouse in.

This same exercise, when learned, may be given without the weight on the abdomen. Also, it may be given standing against the wall or in a sitting position. Two children can learn to push back sitting up against each other. This exercise tends to strengthen the abdominal muscles by contraction while at the same time it overcomes hollow backs.

It is an excellent idea to let children work together when possible. Follow the simple abdominal contraction with rolling. This tends to overcome hollow backs, but knees must not be taken high enough to increase round shoulders.

POSITION I: Lying flat on back.

EXERCISE 2: Little children call this "Knee Kissing" and find the process fun. Hands hold corners of the table overhead. The legs do not straighten out between rolls, but start and finish with knees flexed. Do this exercise eight times to commence with: four and rest, four and rest. Increase to sixteen times in groups of four.

POSITION I: Lying flat on back.

EXERCISE 3: Passively stretch the child's legs alternately by flexing at the hip keeping knee straight and ankle at right angle. Most children with poor postures have what is known as tight hamstrings. Four or five times for each leg is sufficient. Note that the down leg is at first elevated from the floor. As the hamstring muscle stretches it becomes easy to keep the leg flat.

Hamstring stretching can be done also by the mother firmly grasping the child's heel and stretching up. Teach the child not to resist, but to help in the process by keeping the other leg flat on the table while you and he together take the leg being stretched as high as possible with a straight knee.

Two children can do hamstring stretching together. They are pushing one another's legs forward and back, both children trying to hold perfectly straight knees. We call this exercise the "See-Saw." There are many ways of doing this hamstring stretching. The last suggestion is especially for little children.

POSITION I: Lying flat on back.

EXERCISE 4: See that the toes are turned up looking at the nose. The hands reach as high as possible. The child is actively doing in a lying position what the different groups of muscles have been doing in Exercises 1, 2 and 3. In addition, he is stretching his spine and his posture is as perfect as is possible for him at this

*Thomas, L., and Goldthwait, J., *Body Mechanics and Health:* Houghton Mifflin Co., Boston, 1922.

time. *Stretch and rest.* Do this six or eight times.

Now you have your first day's order. Work at it every day for a week in the order shown. Altogether, it should take about ten or twelve minutes. At the end of the next week make the Rest Position with the roll under the shoulders always the last thing on your day's order. The size of the roll under the shoulders can be gradually increased as the child becomes accustomed to the rest position.

SECOND DAY'S ORDER.

A fundamental standing position we will call Position II. It is as follows:

(1) Head high.
(2) Weight evenly balanced.
(3) Arms falling at sides.
(4) Abdomen in.

At first, it is a little difficult to explain to a very small child what is meant by "weight evenly balanced." The weight should be evenly balanced, neither too far forward, nor on the heels. A child with even the slightest degree of fatigue posture is inclined to stand with his hands falling to the front, and his pelvis and abdomen thrown forward. The whole torso suffers, consequently. Teach him to have his heels free, easy to raise from the floor without shifting weight in order to do so. If a little boy, tell him the reason a military cadet has stripes on the sides of his trousers is that his hands may fall at his sides just where the line comes. Show him how when the shoulders are very round, the hands hang in front—not at all like a soldier's.

"Abdomen in" also is very hard to explain to little children, at first. They invariably pull in by lifting the chest which, of course, is wrong. I have put my finger on the junction in the skin which is sublaxed when the pelvis is thrown forward and the abdomen prominent and prolapsed. I have told the child that this is a lock. When he stands straight, with "abdomen in" the joint is locked. I have yet to find a baby from three to six years who does not understand and love the game of "lock in his back and key in his head."

The standing position being well understood, you can proceed with your second day's order. Some children might be ready for the second day's order in one week and others not for two weeks or longer.

POSITION II: Standing.

EXERCISE 5: Teach the child to push back against the wall just as you did when he was lying down. Try not to let the chest come up. Do this six times. In a week or so make it twelve times.

POSITION II: Standing.

EXERCISE 6: Stand the child with feet a few inches from the wall, facing the wall. Have him creep with arms diagonally up, head back resting on the spine. Tell him to creep up like a fly and when he gets as high as possible tell him to "go a little higher." The suggestion of a fly may have to be left out if, like the baby daughter of a famous physician in Pasadena, he never has seen a fly. I was trying to teach the baby this exercise for the first time when the mother reproached me quite severely. "Don't tell her that," said the fond parent, "why, she never has seen a fly."

This exercise known as "wall creeping" raises the diaphragm, stretching the intercostal muscles between the ribs, tending to stretch the spine and overcome forward head.

POSITION II: Sitting with legs crossed tailor-fashion.

EXERCISE 7: Arms raised to side with palms up. Do not allow the child to lift the arms above shoulder height or so shrug the shoulders upward. Breathe gradually. Arms are held with palms up for six counts. I play that small children are flying as they do this. I explain that when the arms are being held six counts the "Dicky-Bird" is resting on a cloud. Do this ten times; five and rest, five and rest. This exercise is especially helpful for round shoulders and contracted chest.

POSITION II.

EXERCISE 8: The Bow-Wow exercise. The child starts in lying position, face downward on table or floor. He then comes up on his hands and toes, raising his back as high as possible, then walking forward with stiff legs, he tries to keep his heels down.

Teach the child to contract the abdomen and gradually work the heels down to the table. This stretches the long muscles in the back of the legs, helps to correct a sagging of the abdomen, and also overcomes hollow back. Do this for about two minutes at a time.

Finish your second day's order (which perhaps you have not been able to commence until two or three weeks after the first one) with the *rest position:* roll under the shoulders for five minutes, followed by two minutes flat. Your second lesson should not take, rest included, over fifteen minutes.

THIRD DAY'S ORDER.

Your third day's order follows; you may be ready for it in ten days, although slower and less responsive children may take a month's training in the first and second lessons. By slow, I mean not necessarily from a mental standpoint but from the physical. You are now going to combine what you learned in the first two lessons.

Commence with your fundamental standing position. Let the child walk, not stiffly, but easily and naturally, trying all the time to keep his "tummy" in. Let him walk some distance out of the room and back again, commencing and ending position in front of the mirror. The mirror is arranged so the child, himself, can see whether his position is good. Then follow your standing and lying down exercises. End with five minutes' rest with the roll under the shoulders and two minutes flat.

The child is now ready for a good, substantial day's order. The following exercises and those already given are for the so-called "normal" child. It must never be forgotten that there are conditions calling for the attention of an orthopaedic surgeon. The early morning exercises on the radio find the whole family interested. Let little Johnnie become as interested in gaining weight and standing like a Boy Scout as his fat daddy is in reducing!

FINAL DAY'S ORDER: Standing Position.

EXERCISE 1: Arms raise to side (with or without dumb bells) as in Exercise 3 in the dumb bell series. Ten times of twenty counts.

EXERCISE 2: Hang and sag, head back, if you have a bar. The light apparatus is listed in the back of this book. Do this three times. If a bar is not available, do wall creeping, instead. Six times. The hanging exercise has the same advantages and greater value than the creeping.

EXERCISE 3: Sitting with arms up, hands behind neck, abdomen contracted. Grasp the child's arms and rotate outward and backward, gradually stretching the chest muscles. This is called "Wings Circle" and should be done six or eight times. It is given for contracted chests and round shoulders.

EXERCISE 4: The child is lying, face downward, with thighs supported on a bench, knees extended in straight line with feet slightly braced for steadiness, trunk also

extended in straight line beyond bench, hands as in Exercise 4. It is important that the muscles across the shoulders be well contracted and that the child does not raise the shoulders too high. This exercise is called "The Turtle." It should be done three times and rest, three times and rest.

EXERCISE 5: Lying on back, hold the table with arms over head, bend the knees to the chest as in rolling. Straighten legs to angle of forty-five degrees, hold six counts, legs down and rest. It is best for the child with hollow back not to do this exercise even when the back condition is corrected. It gives excellent abdominal contraction and can be gradually increased in duration of the straight leg position. Notice that the toes are turned upward. Two times and rest, two times and rest.

EXERCISE 6: In the "Aeroplane" exercise the child lies face downward, hands clasped behind the buttocks, then lift trunk and chest in straight line, while turning hands outward and retracting shoulder blades. As in Exercise 5, care should be taken not to let the child raise the shoulders too high. Four times and rest, four times and rest. This exercise stretches all the chest muscles and corrects prominent shoulder blades and round dorsal backs. All tendency to hollow the back must be corrected before doing Exercise 6.

EXERCISE 7: Swimming. The action of the arms is as in breast stroke swimming. The legs open, heels kick together with knees apart, then throw down straight. About two minutes and rest, two minutes and rest. Very little children can be taught to swim in this way and think it great fun. This exercise develops coordination and increases development in the good position of nearly every muscle in the body.

EXERCISE 9: The "Tailor" exercise. The feet are tucked up tightly in a sitting position. Downward pressure is put on the knees as in the illustration. This is actively corrective for knock knees and bow legs.

The Corrective Dumb Bell Series following must be taught very gradually. The first five exercises of the series can be given to children under six years of age. The last three exercises are appropriate for children of eight or nine years and older.

Corrective Dumb Bell Drill

1. Arms down at sides; rotate outward; 8 counts; and,
2. Arms at shoulder height; palms up; rotate outward; 8 counts; and,
3. Arms raise to shoulder height; palms up; raise and sink; 8 counts; and,
4. Arms to side at shoulder height; pull in slowly to shoulders; 8 counts; and,
5. Arms circle outward with breathing; 8 counts; and,
6. Arms bend with dumb bells over shoulders, then
   (1) Lunge forward on right leg,
   (2) Dumb bells to floor,
   (3) Dumb bells up to sides,
   (4) Position.

   Right leg then left leg; 8 counts; and,
7. Lunge to side with arms to side at shoulder height, then
   (1) Down to floor looking at upper lobe of opposite dumb bell,
   (2) Hold,
   (3) and (4) Change over to opposite side,
   (5) and (6) Up,
   (7) and (8) Position; and,
8. Standing good position, then
   (1) Arms front at shoulder height,
   (2) Open to sides,
   (3) Right side,
   (4) Open,
   (5) Left side,
   (6) Open,
   (7) Overhead with bent arms,
   (8) Open,
   (9) Behind back with bent arms,
   (10) Open.

PECULIARITIES OF GROWTH

The exercises in the foregoing chapters are merely suggestions, not only as to type, but as to manner of procedure. They can be enlarged upon or modified as the occasion may require. Some of them are original, many of them are not. The best exercises are developed in the gymnasium when the child presents himself for exercises for correction. No two children are identically the same—therefore, no specific group of exercises can be quite adequate or every exercise exactly perfect for every child.

Knock knees and bow legs are sometimes corrected in a few weeks. Sometimes, when nutrition is such that the elements necessary to form strong bones are not all that they should be, the process of correction will take longer. Often times it is necessary to see an orthopaedist —the prescription for a slight alteration on the shoe heel being essential to accomplish and maintain correction. The manipulative treatment of knock knees or bow legs is easily learned by the mother and must be carried out faithfully at home. The legs of children under one year can be straightened as easily as green sticks, care being taken that pressure is put in the right places. Knock knees have often been over-corrected and consequently bow legs developed because the mother was not properly instructed where correct pressure should be exerted. It would not be safe to try and explain in writing how the manipulation should be done. Simple though it is, and easy to carry out at home, the first lessons must be given by the surgeon or the physical director trained in corrective exercises. The older the child, the less easy the correction from the manipulative viewpoint.

In conclusion, children do not "outgrow" conditions of deformity. If nothing be done to correct the little girl with round shoulders, hollow back, and general fatigue posture, she will grow up to be a willowy, tired sort of woman with whom we all are familiar.

Another important thing to remember—there are no such things as "growing pains." There are pains caused by posture strain and there are pains due to other real causes. Your child specialist can locate the cause and tell you how to correct it. Also, there is such a thing as the pain that is not physical—the kind of pain that comes when Johnny has to pick up his toys or when Mary must go to bed knowing the grown-ups of the family are having a party. It is apparently static pain, but it is in the mind. However, a "pain in the mind" is not persistent and is soon overcome. Do not be unsympathetic. Know your child. Sympathy allowed to run unchecked will do quick damage. Lack of sympathy from Mother and Father will cause the child to look elsewhere for it. And without infinite sympathy well controlled, and a patience backed by understanding—correction, be it physical or otherwise, would be impossible.

APPARATUS

Apparatus is always fun. Some apparatus has distinct corrective value, but it is of importance that the stress be laid, not on the apparatus, but on the corrective position that can be gained in the child, himself. More can be accomplished in an empty room if there is knowledge of fundamental positions, than in a gymnasium full

of equipment. However, with posture once understood and practiced, there are several pieces of equipment that are fun to use and that are of therapeutic value.

(1) Dumb bells may be used in many ways, some of which are illustrated in the dumb bell drill. They help to develop muscle.

(2) Indian clubs are conducive to grace and rhythm. They teach ease of motion and coordination. There is no advantage in having them over three-quarters of a pound in weight even for a husky boy of twelve. Indian clubs in outward arm and hand circles overcome contracted chest muscles.

(3) Wands have a corrective value especially for round shoulders. They tend toward symmetry and are of use in slow, gradual stretchings.

(4) The boxing bag is of value, if placed high enough, in the correction of forward heads. Boxing also develops little arms that have not kept time with quick running and jumping legs.

(5) The bar stall, favorite of all Swedish instructors, is about the best piece of gymnasium apparatus that I, personally, have ever used. Just to hang and sag is a splendid exercise, for the child with a slight postural deviation. To hang and swing from side to side from the shoulders is a very good exercise, if not overdone. All leg and knee raising exercises that are usually done lying down may be done in a straight hanging position as soon as the child can be taught on the bar stall. For a post infantile case or a spastic condition such as some of you mothers have to contend with, the bar stall has almost no limits to its usefulness.

(6) A balance beam is excellent for those children who lack poise and are clumsy in their movements. Just straight walking should be taught first and high knee raising, goose stepping, et cetera. A book or head weight is conducive to good balance and erect posture.

(7) For those fortunate children who have a swimming pool in their own homes or who have access to one, there is no better equipment for a strong and healthy development. Contracted chests can be overcome, little cramped ribs stretched out, sub-costal angles opened, et cetera. Endless are the advantages of swimming. The breast stroke gives the best all around development and increases endurance. Overhead swimming with the low shoulder high tells of its own correction. And although this little book is for the mother of the normal boy or girl, I can not help mentioning just once more for the sake of the thousands who have suffered that dread disease, Infantile Paralysis, that much can be accomplished by exercise in the water that is nearly impossible on the table or bed.

SUN BATHS

Just a resume concerning sun baths and we will have covered in short detail some of the things that have helped other people's children. If they serve to help your children, too, this little book has fulfilled its complete duty.

There is no doubt that the medical men commend sunlight and fresh air as curative. Very exact scientific research has proven that certain times of day, length and method of exposure are necessarily the prescription of the physician for each particular case.

Mid-day sun has worked damaged. The heat of the sun is enervating and I have known of more than one over-ambitious mother who has misapplied the sun bath to her child and caused fever and destruction. Therefore, I say, that it is important before going ahead that one should learn first when and how the sun bath should be given. Results in children are different. Tanning of the skin must be gradual. Children with red hair will very often freckle before they tan. They are slower to respond to the sun bath than those children who brown quickly and evenly all over.

In general, we go by the following regime. But, as I say, this method is not advisable for every individual child.

First day—Expose feet only for five minutes at a time.

Second day—Feet and knees for ten minutes.

Third day—Feet and limbs as far as hips for fifteen minutes.

Fourth day—Expose to waist line for twenty minutes.

Fifth day—Whole body as far as arm pits for twenty-five minutes.

Sixth day—Expose whole body for half an hour with the head protected. It is of importance that the eyes be shaded.

Seventh day—Turn the child over for five minutes beginning with feet as before, after the front side of the body has been exposed for half an hour. This treatment continues until the child takes half an hour for each side.

Many doctors prescribe this sun bath given as the child plays about the garden wearing small running trunks. It is always important to remember that it is not the heat of the sun, but the chemical effect and powerful penetration of the light itself that cures and is a preventive for rickets, tuberculosis, mal-nutrition and anaemia, all of which the apparently normal child may fall heir to or may, with an ounce of prevention, know nothing about.

Measurements for Sand-bag to be placed under child's shoulders

Bag 14 inches long, 7 inches wide, 14 inches in circumference, 3½ inches in diameter.

Bag should not be filled quite solid. Either sand or saw-dust may be used.

Los Angeles, California.

Tibial Torsion

By Margaret Andrews

INTRODUCTION

Torsion deviations are a part of the whole subject of faulty body alignment that has received very little attention even from Orthopaedic surgeons. Dr. Michael Hoke of Atlanta, Georgia, and Dr. C. LeRoy Lowman, chief of the staff of the Orthopaedic Hospital School, Los Angeles, are, as far as I have been able to determine, the only two surgeons who have anything in print on the subject of tibial torsion.

Dr. Lowman says,[1] "Rotary deformities in the long axis are very common, but have not received the attention they should from the general surgeon and many orthopaedic surgeons fail to recognize it." Elsewhere Dr. Lowman states,[2] "Rarely have we seen much attention given to this condition which is quite common and causes ultimately as much joint and muscle strain and tissue changes as deviations in other planes."

The attitude of many, both laymen and medical men, still seems to be that the child will "outgrow" much of the faulty leg alignment without any help. E. Emmet Holt, M. D., the noted nutrition specialist, has this to say,[3] "The disappearance of even considerable deformities of the bones of the extremities by the growth of the long bones is too well known to need confment. . . . One who has not watched it is continually surprised at the degree of curvature of the legs that may disappear spontaneously in the course of a few years of healthy growth."

On this subject of "outgrowing" defects, Dr. Lowman expresses the following opinion:[4] "Considering the fact that 80 per cent of the adult patients presenting foot and leg symptoms have some fault in leg alignment, we can readily see why it is important to at least stop telling mothers that children will outgrow these defects, because only under careful treatment or exceptionally favorable conditions will such a thing occur. Let us look well into the future then when we address our efforts to the care of skeletal faults in children."

Clifford Sweet, M. D., relative to growth deviations says,[5] "After we began some years ago to scan carefully every child with reference to his posture, we noticed: (1) That faulty posture was rare in young infants while very common in older children, especially in pre-school groups; (2) That with faulty posture of older children went almost constantly certain deformities of the feet and deflection of the weight bearing line in its foot and leg passage."

A few writers in the field of corrective physical education make clear that in the maintenance of correct posture the weight bearing line must pass through the center of the knee and ankle joint.

In an analysis of the mechanics of walking, Lillian Drew states:[6] "The weight of the body as it is carried, in order to be transmitted in the most economic manner, must pass through the center of the hips, knees and ankle joint and the long axis of the femur and tibia of the advanced foot."

There is little said, however, as to the handling of those who find it impossible to bring the legs and feet into correct alignment or those who perhaps can assume a fair position in standing, but who cannot maintain it in walking.

Seldom do we find any mention made of the outward

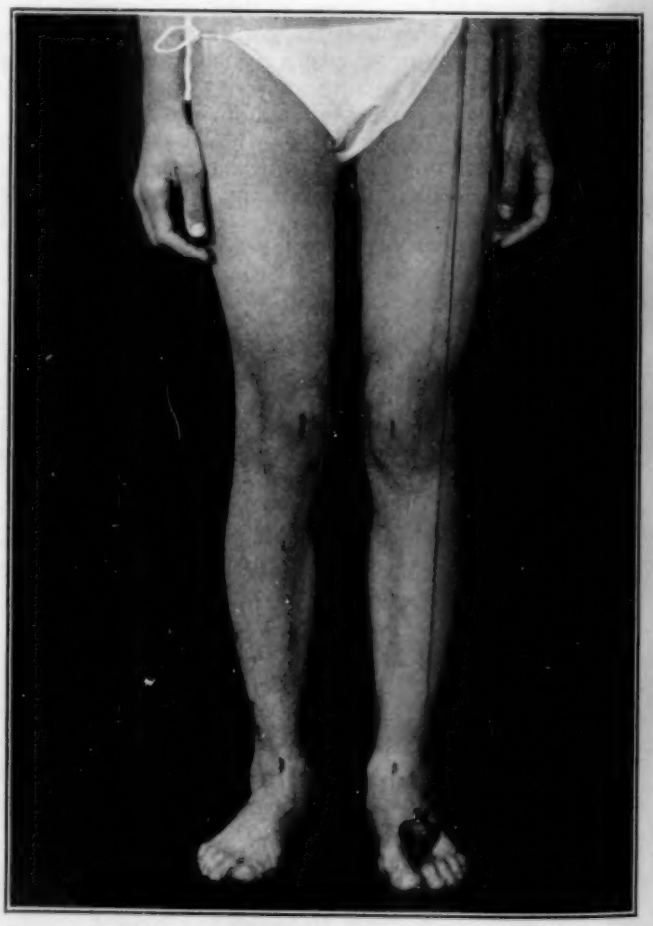

FIGURE I—NATURAL STANDING POSITION. THE PLUMB LINE FALLS THROUGH NEITHER THE CENTER OF THE PATELLA NOR THE ANKLE JOINT MORTISE.

[1] "The Surgical Importance of Torsion Deformities," The Boston Medical and Surgical Journal, September 20, 1923.

[2] "Preventive and Prophylactic Orthopaedic Practice," Reprint from The Journal of Orthopaedic Surgery, November, 1921.

[3] "Growth as a Factor in Prognosis," Journal American Medical Association, Vol. 82, No. 17.

[4] "The Significance of Growth Deviations in Children," California and Western Medicine, March, 1926.

[5] "The Postural Development of Infants with Special Reference to the Development of the Function of Walking and Proper Shoeing," California and Western Medicine, August, 1926.

[6] "Individual Gymnastics," Chapter X, p. 172.

rotators of the thigh and knee in the discussion of correct body alignment. Dr. Lowman in reference to this says,[7] "In ordinary clinical experience I have rarely found a post graduate physical director, physician or student who can name the rotators of the thigh."

The fact that there is so little written about torsion of the legs and there are such a large number of cases to be seen in the Posture Clinics of the Orthopaedic Hospital School where I am having the opportunity of making some close observations determined me to make a study of this problem in order to glean, if possible, some facts that might be of interest to the workers in the field of Corrective Physical Education.

In this study I have confined myself to the study of *tibial* torsion only and I have eliminated all cases with the history of a pathological condition of any kind.

The manner of estimating tibial deviations was done according to the method described by Dr. Lowman as follows:[8] "Compare the mid-line of the foot or anteroposterior axis of the ankle joint mortise with the axis of motion of the knee joint."

Dr. Hoke describes the normal architecture of the leg and foot in much the same way,[9] "The axis of the knee and ankle are in line; there is no *twist* in the tibia; the axis of the neck of the astragalus is prolonged forward and passes through the anterior end of the first metatarsal."

Evidences of torsion were noted from the rear as well as from the front by the use of the plumb line and by observing the gait in both running and walking.

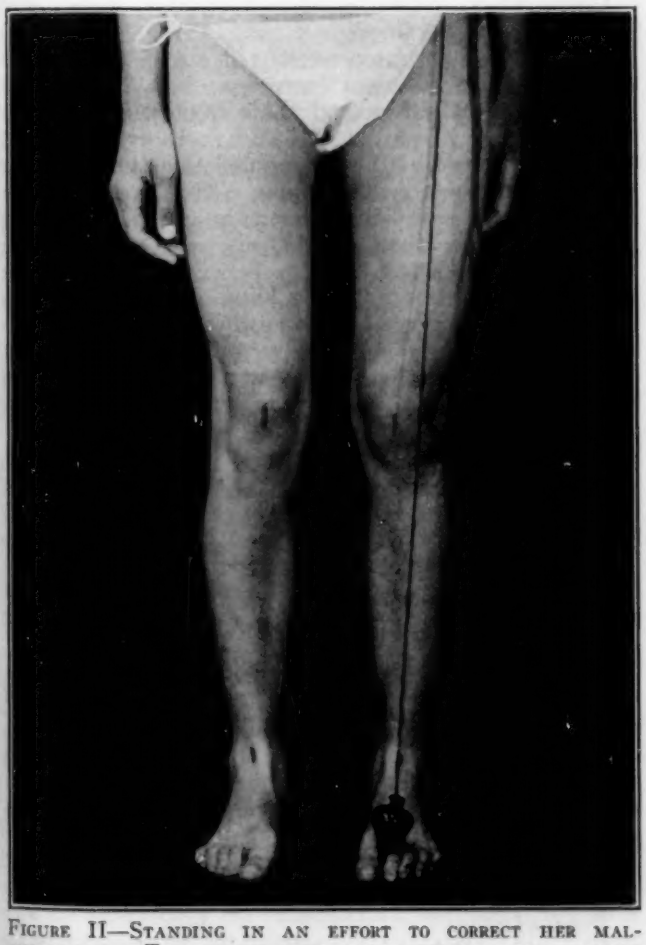

FIGURE II—STANDING IN AN EFFORT TO CORRECT HER MALALIGNMENT. THE PLUMB LINE FALLS THROUGH THE ANKLE JOINT MORTISE, BUT THE CENTER OF THE PATELLA IS STILL CONSIDERABLY TO THE INSIDE OF THE PLUMB.

In the diagnosis this term "tibial torsion" was used to cover not only those cases in which an actual tort in the tibia had occurred, but also those in which there might have been only a relaxation of the musculature which had allowed sufficient rotation inward to bring the patella out of line with the middle of the ankle joint mortise.

ANALYSIS OF CASES

Table I—Defects Accompanying the Fifty Cases of Tibial Torsion

Order of Frequency	*Number*	*Per Cent*
1. Pronated Ankles	34	68
2. Depressed Arches or Flat Feet	31	62
3. Relaxed Posture	29	58
4. Knock Knees	15	30
5. Undernourished	6	12
6. Endocrine	5	10
7. Bowing of the Tibia	2	4

Other deviations from the normal.—A study of the other deviations from the normal was made in order to determine, if possible, whether or not they had any bearing upon torsion or the reverse. As can be seen from a study of the chart the most frequent accompaniment was pronated ankles, there being 34 out of 50 showing this defect. The next in frequency was depressed arches and flat feet, there being 31 out of 50 cases. A large number of the cases showed both the abnormal arch and foot condition. Twenty-nine of the 50 cases or 58 per cent had relaxed posture.

Additional points noted which might have a bearing as a causative factor were,—the age and type of the child, the amount of undernourishment and the endocrine disturbances. The results of this part of the investigation are as follows:

		Number	*Per Cent*
Children under 6 years showing torsion		12	24
Classification according to type	lythe	18	36
	medium	26	52
	heavy	6	12
Undernourishment		6	12
Endocrine		5	10

The oldest child was 17 years and the youngest 22 months. My feeling when I began to study this problem was that the strain of school life might have an important bearing. But as there were 24 per cent under 6 years of age, at least school life is not the prime factor. The 22 months old child had, in addition to the torsion, knock knees which had changed from bowlegs, also a slight bowing of the tibia.

As has been noted the majority of the children were of the medium type, while 36 per cent were of the lythe type and 6 per cent of the heavy. But one must keep in mind that many of these apparently medium type children will no doubt evidence lythe type characteristics. So if this study were to be made of these children a few years later a large per cent probably would have swung over to the lythe group, and would consequently be subject to greater joint strain in the years to come.

If one can judge the child at the time of examination, undernourishment does not play an important part, that is undernourishment in the ordinary sense of the term. Indications are however that there has been a deficiency in calcium in cases of real torsion and probably a lack of something inherent in the muscles and ligaments.

The 12 per cent with endocrine disturbances is sufficient to demand consideration.

This quotation from Dr. Peckham[10] will serve to sub-

[7] "Rotatory Subluxation of the Knee," Bone and Joint Surgery, October, 1924.

[8] "Rotation Deformities," Boston Medical and Surgical Journal, May, 1922.

[9] "An Operation for Stabilizing Paralytic Feet," The Journal of Orthopaedic Surgery, October, 1931.

[10] "Many Orthopaedic Difficulties Due to Calcium Deficiency," Journal American Medical Association, November 13, 1920.

stantiate the above statement, "When calcium metabolism is interfered with there may result a deficiency in which case bones, muscles, nerves, ligaments are deprived of calcium. Under these conditions there may directly result scoliosis, knock knees, bow legs, flat feet," and he might have added tibial torsion.

Degree of Torsion.—The degree of torsion varied from 5 to 25 per cent.

Gait.—In cases of slight degree of torsion there is no noticeable variation in gait from the normal, but beyond probably 5 to 10 per cent there is what might be called a characteristic gait. A circular swing of the foot in and a criss cross of the knees. In running it is usually referred to as the "bandy legged" gait.

Sitting on a Chair.—The natural position in sitting in a chair was with the knees in and the feet toeing out.

Sitting on the Floor.—When the younger children were asked to sit on the floor the majority of them sat down with the knees in and feet beside the trochanters—a position popular with the flexible type child when playing jacks. (See Figure III.)

FIGURE III—THE SITTING POSITION POPULAR WITH THE FLEXIBLE TYPE CHILD. ONE WHICH TENDS TO INCREASE TIBIAL TORSION.

METHODS OF TREATMENT

Examinations.—All cases received a complete medical as well as orthopaedic examination. Eyes, teeth, tonsils, etc., were taken care of if such treatment was indicated. The nutrition was looked after by a specialist in that field.

Shoe Correction.—Since tibial torsion in all the fifty cases was associated with other foot and leg conditions, and in some cases the torsion is the least serious, the treatment of the entire lower extremities must be considered.

For all cases stiff shank orthopaedic shoes high or low depending upon the severity of the foot condition and the age of the child, were prescribed. In all cases the advanced tilted heel was used. Here again the foot condition and age of the child determined the amount of the advance and tilt.

The sponge rubber pads for the longitudinal arches were placed in the shoes of the young children whose foot condition indicated the need for them and in those of the mild cases among the older children.

Sponge rubber metatarsal pads were used where indicated.

For all the more severe cases of pronated ankles and depressed arches among the older children steel arch plates were described. These plates were especially made for each case and carefully adjusted.

Exercises and Posture Training.—All the children with the exception of the very youngest reported to the gymnasium at regular intervals for instruction. The work was carried on daily at home.

Exercises that tend to develop the outward rotators of the thigh were emphasized.

The children were trained to sit, stand and walk correctly.

In some cases the parents provided the tilted balance boards made after Dr. Lowman's design which the children were instructed to use regularly at home.

RESULTS OF TREATMENT

Twelve of the 50 cases were not used in tabulating results because of failure to return. From the remaining 36, the following facts have been gathered: Time spent on treatments ranged from 3 months to 7 years. There was on the part of some parents and children excellent cooperation and the reverse on the part of others.

Tibial Torsion

Corrected by means of shoe correction, exercises and posture training	0
Improvement by same means	1
Surgery, as a means of correction	2
Improvement in foot and ankle condition	18 or 50 per cent

As will be seen by the above tabulations tibial torsion does not yield to shoe correction, exercises and posture training. However, improvement in general alignment and better functioning of the legs as a result of the treatment made effort worthwhile; thus lessening the strain on hip, knee and ankle joint. Relief of tension on Bigelow's ligament (the y ligament or anterior ligament of hip joint) probably being the most important factor here. The strengthening of the outward rotators might help prevent torsion from becoming worse.

As has been stated, all cases were accompanied by either pronated ankles or depressed arches or both and in the majority of cases the child was brought to the clinic for these defects. The figures show that the effort was by no means wasted.

We can safely say that children do not outgrow faulty foot and leg conditions, and it is only by persistence on the part of all concerned that they can be improved or overcome.

Tibial torsion in the true sense of the term cannot be corrected by anything short of surgery and orthopaedic surgeons differ as to the advisability of operating.

A detailed report of one case with torsion estimated at 25 per cent is given here to show some differences of opinion with regard to the justifiability of surgery in such cases.

CASE REPORT

1. Entered January 19, 1928. Age—7½.

Type.—Lythe.

Diagnosis.—Relaxed posture, pigeon chest, hollow back, pronated ankles, short leg right, bilateral tibial torsion.

Mother's reason for bringing child: "Some difficulty with feet and legs."

Treatment (feet and legs only given here).—Shoes—High stiff shank orthopaedic shoes with advanced tilted heels, lift on shoe on side of short leg. Later—⅛ raise

under 5th metatarsal to offset over-correction to the outside; at a later period the child was allowed to wear orthopaedic oxfords.

Progress Notes by Members of the Staff

11-6-30: "Torsion of the tibia still continues very pronounced. Continue exercises and corrective shoes and return in two months . . . regarding advisability of tibial torsion operation in her case as she has been coming in about two years doing very faithful work and the condition does not seem to correct."—Dr. A.

11-18-30: "The only possible correction of marked degree of torsion would be of high tibial torsion osteotomy. Should like to have the opinion of the other staff men as to whether they would consider this justifiable."—Dr. B.

11-22-30: "In our opinion should have bilateral tibial torsion."—Dr. C.

11-22-30: "Tibial torsion is markedly developed in this case and the gait running and walking will undoubtedly be made less awkward by correction of this deformity. Personally, however, would not recommend surgery because the degree of disability does not to me warrant the operation."—Dr. D.

11-31-30: "Due to history of no pain in feet and since patient is maintaining fair degree of longitudinal arch with shoe correction, even though tibial torsion is quite severe, in my opinion I would wait for a while before considering tibial torsion osteotomy."—Dr. E.

11-31-30: "As patient is only 10 years old and has had freedom from hay fever only one year, it would seem advisable to watch condition for a while, probably another year, and if there is any tendency to increase tibial torsion deformity osteotomy for correction would be indicated."—Dr. F.

1-2-31: "At present time ability to correct both pronation of feet and rotation of knees tibial osteotomy is not advised. Suggest that present treatment be continued and question of tibial torsion osteotomy be held in abeyance until some future time."—Dr. G.

1-2-31: "Patient has been coming in for treatment and observation of the feet for over two years. Inspection indicates some improvement of long arches but *tibial torsion remains unchanged.* As tibial torsion is fairly severe and always will be a *factor* in preventing correction of the feet and since the operation is fairly simple, I should think tibial torsion osteotomy justifiable. Mother is favorable toward having the operation if felt it is for child's best good."—Dr. H.

4-9-31: "Believe that in view of the fact that the child will be of a sturdy type with reasonably good health that the degree of *joint strain* would not be *as much* as in the thin type of person if surgery is not instituted. Would suggest that she continue posture exercises but not have surgery at this time although I would feel justified in operating or backing up anyone who did."—Dr. B.

SUMMARY AND CONCLUSIONS

Tibial torsion in the real sense of the word cannot be corrected by exercises and shoe correction although something can be done to improve the function of the legs by developing the musculature, especially the outward rotations of the thighs.

The preceding statement is not meant to imply that the wearing of a properly and corrected broad base shoe is not most important in all cases of tibial torsion.

Children with tibial torsion have a distinct gait, which from an aesthetic viewpoint is unfortunate and from the standpoint of good body mechanics is a real handicap.

The early recognition of the tendency toward tibial torsion is important and preventive measures applied before a real tort in the bone occurs, which can be corrected by means of surgery only, unless perhaps in the very young child whose bones are still plastic. Early preventive measures will help to save future joint involvement, the value of which has been practically overlooked.

The most important preventive measures are a normal calcium metabolism, normal thyroid secretion and good habits of sitting, standing and walking.

Pronated ankles, depressed arches or flat feet are common accompaniments of tibial torsion, there being 68 per cent of the 50 cases studied with the first mentioned and 62 per cent with one or the other of the latter two. The majority of the cases had both pronated ankles and either depressed arches or flat feet.

The majority of the young children when told to sit down on the floor or table sat with the knees approximated and the feet beside the trochanters. This is undoubtedly a factor in the development of tibial torsion and should be discouraged.

Children do not "outgrow" faulty leg alignment.

Osteotomy for the correction of tibial torsion is a comparatively simple operation, but is not commonly resorted to except in cases in which there is deformity caused by some disease such as poliomeyelitis. There is, however, probably no real reason why surgery should not be performed in cases of severe torsion such as the case dealt with on page 216 of the text. This very common torsion deformity should receive more attention from both surgeons and laymen, especially those of the latter group who are concerned with normal growth development.

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EDITORIALS

Our position as physiotherapists has been greatly enhanced since the war. We are being thought of and considered as a branch of the medical profession. Our organization is gaining recognition and we do all we can to strengthen this fact.

The question of wearing the A. P. A. embroidered emblem on the sleeve of our uniforms, I believe, has often been brought up and encouraged, but as far as I know has never had many followers. No doubt, the difficulty of fitting it to different types of sleeves and sewing it on has proved too much for most of us.

The problem of some distinction of appearance for physiotherapy technicians from technicians of other branches in medicine should be made and the manner seems ripe for solving!

We are getting lists of authorized schools and only students of such schools or their equivalent are admitted to our association. We should be proud to wear some sign to distinguish us from women with less or practically no training or experience. Let us wear some insignia to make people, doctors and laymen look at us as a profession and not only as outstanding individuals.

The A. P. A. emblems as sold by Filenes is fine but if it proves too bothersome to attach let us wear our pin. It is a good-looking one and it takes practically no time to pin it on. Why can't we get together and buy it and wear it and take the time to explain what it stands for when asked? This would be time well spent.

M. P.

Well-Balanced Work in Physiotherapy

Dr. F. W. Harvey, director of physiotherapy of the Montreal General Hospital, has expressed one of the problems which confronts the hospital service of America. He points out that well-balanced work and trained technicians are the essentials in physiotherapy. He says, "Physiotherapy has now become such a big thing that we find very few men with a knowledge of all its branches. The result is that in most hospitals, physiotherapists confine their work to electrotherapy and very little attention is given to massage and re-education work." (Page 183, THE PHYSIOTHERAPY REVIEW, July-Aug., 1931.)

How often are we seeing that same mistake in our hospitals in the United States! A promising new physiotherapy department is started in a hospital or industrial clinic with a disproportionate amount of electrical or other machines and no space, equipment, nor comprehension of the need for corrective exercise. These same hospitals pass in the name of being standard.

This makes us think, what can be done to help correct this lack in establishing well-balanced physiotherapy departments in the hospitals of our country? The men who are establishing these departments are going ahead with the enthusiasm and understanding that they have, and that they do not have a comprehension of the whole field of physiotherapy is only a fault of their training.

So then let us look more earnestly to our requirements for training schools. Yes, let us define. What is an approved course in nursing? What is an approved course in physical education? What is an approved course in physiotherapy? Let the medical profession become so conscious of the whole field of physiotherapy, and the uses of each branch in application, that we no longer can have a "standard" hospital that has anything less than a standard physiotherapy department.

We cannot be too thorough, nor repeat too often our standards of training. Every reply to inquiry made to our association, reaps a harvest of respect and enlightenment.

In recognizing a school of training in physiotherapy, the American Physiotherapy Association is indorsing the influence which that school has in inspiring the executives who establish new physiotherapy departments in hospitals and clinics. That school influences, all down the years, the many physicians and technicians who look to it for guidance when they answer

the questions,—What is a well-balanced physiotherapy department? What must technicians know in order to be efficient?

These same schools will help create the demand for future legislation to help protect the profession of physiotherapy. Have not nurses state registration requirements been largely established by the influence of their large training schools?

It is noticeable that the communities where the recognized physiotherapy training schools are located, have the strongest chapters and the most backing by the medical profession. This is to be expected and it does indicate our sources for future strength. So let us look well to our training schools, that they do not fall short in representing physiotherapy at its best,—all branches understood and evaluated! C. H.

Boston Children's Hospital Contest

FOR MATERIAL TO IMPROVE THE TEACHING OF BODY MECHANICS

OBJECT—Better Body Mechanics in School Children. Are you trying to combine interest and progression with the necessary fundamentals in your teaching so that willing cooperation and habit will maintain good posture in your classes? Prizes will be given for papers describing practical methods of obtaining better Body Mechanics in school children. Certain fields may be chosen, for instance: Certain grades in schools. Schools for Crippled Children. Clinics.

JUDGES—Dr. Robert B. Osgood, Professor of Orthopedic Surgery, Harvard. Dr. A. H. Brewster, Children's Hospital Clinic for Lateral Curvature of Spine and Faulty Posture. Miss Leah Thomas, Ass't Professor Physical Education, Smith College. Miss Janet B. Merrill, Dep't Physiotherapy, Children's Hospital.

Entries will be accepted from Physical Therapy workers and physical education teachers individually and from the heads of school departments or clinics as group entries.

For rules of the contest, apply to the Physiotherapy Department, Children's Hospital, Boston. Winners will be announced at the time of the 1932 American Physiotherapy Association Convention.

May 5, 1931.

Miss Janet B. Merrill, Director,
Department of Physiotherapy,
Children's Hospital, Boston.

Dear Miss Merrill:

The Report of the Sub-Committee on Body Mechanics of the White House Conference suggests that over 75 per cent of the school children of the United States exhibit poor or bad body mechanics. The report also suggests that there is a close association between good body mechanics and good functional health and poor body mechanics and poor functional health. The causes of this surprisingly large incidence of poor body mechanics need to be investigated, but whatever the causes are, poor body mechanics is not inevitable and may be improved by an amount of training which does not conflict with the regular school curricula of studies or physical education, as was shown by the Chelsea Survey. Reliable data are at hand also which seem to prove that given proper incentives, improved body mechanics once attained as a result of training is maintained without continued training by the vast majority of children.

If the findings of the White House Conference are correct, all physical therapists are faced with a challenge to better existing conditions. There is at present far too casual training in the principles of body mechanics in most of the schools of physical education. Correct body mechanics should underlie all physical therapy. There is much work to be done and we need the help of all physical therapists. The goal is no less than a more efficient race.

Very sincerely yours,
ROBERT B. OSGOOD, M. D.

RULES

Papers submitted must stress the fundamentals of correct Body Mechanics throughout—in addition they should emphasize methods of holding the children's interest or should show definite progression extending over two or three grades of school age.

Material dealing with the pre-school or kindergarten age will not be considered.

Papers may be of any desired length, and must contain a comprehensive program extending over at least one year's work. They should be typewritten on one side and can not be returned. Material submitted will not be published without the consent of the author, but may be used for the benefit of other instructors.

In order to be considered for the competition, entries must be received not later than May 1, 1932.

First prize, $50, from the Children's Hospital Research Fund. Second prize, $25. Honorable mention.

Winners will be announced at the 1932 convention of the American Physiotherapy Association.

On Nov. 1 Miss Clara M. Eisenbrey of Boston, Mass., will take over the directorship of the Bureau of Appointments.

Round Table Discussion on Department Administration

Gertrude Beard, Presiding

Tenth Annual Convention, Philadelphia, Pa., Program for Thursday Morning, June 11, 1931

In presenting this problem we have tried to bring out the various problems that come up in departments and a discussion of these topics from the standpoint of the various phases of the work as it is carried on by our various members. The first paper is the "Relation of the Physical Therapy Department to the Entire Organization." In thinking of organization there comes to my mind one of the outstanding ones in our country, where everything is so efficiently organized that it is an example to others. I mean the Mayo Clinic. Miss Ann Kelley of the Mayo Clinic will give us this paper.

RELATION OF THE PHYSICAL THERAPY DEPARTMENT TO THE ENTIRE ORGANIZATION

By Ann Kelley, R. N., Section on Physical Therapy, Mayo Clinic, Rochester, Minn.

A properly organized department of physical therapy should form part of every modern hospital. The first problem to be considered by any institution contemplating the addition of a department of physical therapy is that of organization and the relation of such a department to the institution as a whole and to other departments. For best results all therapeutic services should work in close cooperation and their organization should be such as to make such cooperation inevitable. The policies adopted by each therapeutic department should be in harmony with those of every other department.

The chief aim should be to develop within the department a spirit of cooperation with which each professional or nonprofessional worker in the department must be thoroughly imbued. The different phases of physical therapy should be so organized and correlated that the activities of the professional and nonprofessional personnel will acquire that unity of purpose and execution which constitutes teamwork. Every effort must be made to adapt treatment and administration to serve to the best possible advantage every medical and surgical department requiring such treatment for its patients.

Departmental problems can best be solved by conference within the department or with representatives of other departments which may be affected. To best accomplish this purpose it is necessary that the status of the department of physical theraphy should be the same as that of every other department in the institution. Otherwise, cooperation must inevitably be replaced by some measure of domination and this in turn must react on the department and its personnel. Any feeling of inferiority is bound to affect the attitude of the workers and the quality of their work. Effective management, therefore, is the most important factor. Faulty or inefficient management will reflect discreditably upon the department and the entire institution. Any department of physical therapy worthy of the name must be under the direct and constant supervision of a physician especially trained in this phase of medicine and holding a status equal to that of all other physicians in the institution. A department thus organized will command the respect of the staff and will automatically place physical therapy on a level with other therapeutic departments.

The department of physical therapy should be a distinct unit serving all departments equally and should treat only patients referred to it by other departments. Without such reference cases should never be accepted for treatment. Moreover, cases should not be accepted for treatment until clinical and laboratory examinations have been made and a diagnosis established. The decision as to the form or forms of physical therapy to be used in any case must rest with the medical director of the department. When treatment has been completed or at intervals during treatment all patients should be instructed to report for observation to the department by which they were originally referred.

It is the responsibility of the medical director of physical therapy to see that his decisions and that the activities of the department conform to the general policy of the institution. The personnel to serve in the department of physical therapy should be selected by the medical director, either on his own initiative or after consulting with the superintendent of the institution, and such personnel should consist of members of the American Physiotherapy Association.

It is the duty of every non-medical member of the staff of the department of physical therapy to aid the referring physician by accurately and efficiently carrying out his instructions for his patients. If physical therapy is to be kept out of the realm of quackery every effort must be made to avoid antagonizing the physicians who patronize the department. This does not mean that unsound suggestions should necessarily be followed. Usually, a simple explanation is sufficient to remove any misconceptions which may exist, but the manner of making such explanation is most important. The department of physical therapy of the Mayo Clinic is organized and has been incorporated in the institution on this basis. The medical director represents the department and is responsible for all treatment and all activities of the department.

The success or failure of physical therapy depends on the attitude of the medical profession toward us. It is essential, therefore, for our association and for each individual member to make every effort to win

and retain the respect, confidence and good will of our professional employers. This must ever be regarded as the most important of our aims. An unfailing courtesy, intelligent and painstaking attention to every detail of our work, and truthfulness and honesty will go far toward achieving this end.

Medical and Surgical Staff—Miss Ruby Koch

I regret as much as you do that Miss Kisser, of Cleveland, is not here to conduct this discussion, as was originally planned, but I will endeavor to give you my opinion of the "Relation of the Physical Therapy Department to the Medical and Surgical staff."

I think there should be a close professional contact between the Physical Therapy Department and the Medical and Surgical Staff, a harmonious and ethical relationship. There should be time and opportunity to consult the doctor in charge of the patient he is sending for treatment. The physiotherapist should insist that an intelligent requisition for treatment be sent to the Department with each patient, and also members of the staff who have not had sufficient time to inform themselves on the many uses of physiotherapy should be urged to visit the Department frequently to observe the cases treated and the results gained from the treatments given. It would also give them an opportunity to observe how necessary it is to have sufficient equipment and personnel in order to have an efficient department.

I think one way of getting a closer relationship would be to have the surgical and medical staff in making their rounds through the hospital include the Phyical Therapy Department in their rounds perhaps only one day a week, or at least that, and that at that time of the rounds of the surgical staff, have your appointments for the patients sent you from surgery, have their treatments at that time, so they may be able to observe just what you are doing. The same with the medical cases.

I think in making the rounds the medical students, and the interns, would also have an opportunity of getting a better understanding of physiotherapy. Some of them seem to have a very vague idea of what it is all about, but that is all.

I feel that the Physiotherapy Department should be in charge of the doctor or the branch that is using physiotherapy the most, although the Physiotherapy Department should serve all the departments.

Nursing Staff—Ruth Babb (Read by Miss Flora Mitts of the Blodgett Hospital, Grand Rapids, Mich.)

The attempt to discuss the "Relation of the Physical Therapy Department to the entire Organization" in its special phase of relation to the Nursing Staff compels me to hunt out my thoughts from the limbo of the subconscious.

There seems so little to say on the subject, I find myself asking whether this is because affairs have run smoothly or whether I have neglected to project my share of responsibility for a patient's welfare as far as it should rightfully go. Whether in keeping strictly within my own field, trusting the nurses to do likewise I have, instead of overlapping into another's domain, left a gap between our efforts.

To analyze the question the points of contact between nursing and physical therapy practice may serve as a base.

When a doctor makes a request for Physical Therapy treatment he may do so directly or he may leave an order with the nurse. I prefer that he see me directly to have a better understanding of the case and what is to be done, for sooner or later I hunt him out anyway to discuss the case. But if he leaves the order with the nurse she is expected to notify the Physical Therapy Department, and she does.

I then examine the chart, visit the patient, and often speak to the nurse in charge or the one who has attended the doctor on his visit to the patient, to get any comments not written on the chart. If there is any doubt in my mind I hunt the doctor or call him and discuss the matter directly.

Time for the treatment I try to arrange so as not to conflict with necessary routine care. When there are numerous patients this is sometimes impossible but with due notice I find the nurses willing to change the hour of the bath, or keep the dinner tray hot.

If the patient is in condition to come down to the Department for treatment I call the floor when I am ready and the patient and his chart is sent down. When the treatment is over the floor is notified to send for the patient.

If a patient must be treated at the bedside, all the necessary equipment is taken up with the operator. Nurses are not often asked to wait upon the physical therapist but they are sometimes asked for assistance in turning a patient, having the necessary dressings in readiness, or finding some article. They are sometimes asked to take temperatures to watch the effect of a treatment after the operator has finished her work, or to keep extra pillows or blankets to maintain warmth or position of a patient after treatment. These extra attentions are not often required but when they are the reason is explained and the nurses are willing and generous in giving assistance.

The physical therapist does not give other care than her treatment. If the patient desires a drink of water during treatment an operator must make sure it is permitted before giving it to the patient, for the intake and output of liquids for a patient are often tabulated. The physical therapist is expected and does clear away any debris or disorder she has caused by her work. Nurses are often glad to help for the privilege of watching a treatment.

Nurses are given a short course in massage during their Junior period and a short series of lectures and demonstrations on Physical Therapy during their Senior year. They get thereby a smattering of knowledge to help them to understand the place of our work and some of the things we do.

I wonder if I have given you anything you can use in your round table discussion. I wish very much I might be there to take part and to hear what others have to offer. It would be a big help surely. So far as I know the Washington Chapter will not have a representative at Convention this year. We shall look eagerly for the news of all that happens.

Occupational Therapy—Grace Arnold, National Military Home, Sawtelle, Calif.

I thought I might start first with the definition that was given of occupational therapy by Mr. Sammons. He said: "Occupational Therapy is a term now applied to that form of remedial treatment consisting of various types of activity, mental or physical, which relieve a patient temporarily or which either contribute to or hasten recovery from disease or injury. The activity under medical supervision or guidance is consciously motivated. Occupational Therapy will some day rank with anesthetics in taking the suffering out of sickness, and with antitoxins in shortening its duration. The greater part of sickness in chronic dis-

eases is mental, and occupational therapy is thus far our only means of dealing with this factor."

In various hospitals the relationship is more close than it is in others. In my particular work I have not found any place that it was as close as at Walter Reed Hospital, where the director of the Physical Therapy and Occupational Therapy is one and the same person.

In most places of late what I have found is that the educational and recreational end of it has been stressed more than the therapeutic. The ideal way, of course, is to have the patient under physiotherapy taking occupational therapy during the treatment—I mean during that period or following it.

Miss McLean, of the Walter Reed Hospital, tells me that she has had some experience with the relationship between the two sister groups, and she has told me that she would be very glad to explain that, which I think would be of interest to all of us.

If there are others who have that relationship in their hospitals, I would appreciate their telling us about it too.

Mary McLean

I rather feel that I am butting in on Miss Arnold's paper. I don't mean to do that, but we got into a discussion as to occupational therapy and physical therapy, and their relationship. I have just a few words to say about it as I see it at Walter Reed. I happen to work mostly on the orthopedic section of the hospital. I find there we have a great many stiff joints which occupational therapy can help greatly. We also have nerve injuries and things of that type.

Often when I am working on the ward, and looking over the patients, examining them, and ascertaining their progress, I find that occupational therapy can be of great assistance to the physical therapy treatment. So what I do is to examine the patient, jot down a note on whether he has a limitation or inflection, or extension, or whatever it may be, and then I run down to the Occupational Therapy Department and explain the case to the Occupational Therapy Aide. The head of the Occupational Therapy Department, Miss Montgomery, is very good about cooperating with us.

After we have had a little talk about the patient—of course I leave the actual work that the patient is to do up to Miss Montgomery because she knows so much more about it than I do, but I give her what I think will help from a physical therapy standpoint—she works out the schedule, and the patient is assigned to a definite type of occupational therapy work. That is rather the relationship as we have it between the two departments at Walter Reed.

Social Service—Ruth Dupee, Massachusetts General Hospital, Boston, Mass.

When I was asked to discuss this situation I was rather pleased because I have had over twenty years' experience on this phase of the matter, the relationship of physiotherapy with social service, at the Massachusetts General Hospital.

The department was organized with one worker in 1906 to aid the medical doctors in making a more perfect medical diagnosis. At the present time there is a very well organized department there with a great many workers. It also has student assistants and volunteers. The object is to increase social knowledge that will aid in obtaining a better medical diagnosis. Financial situations that rise are met. Home situations that arise are investigated and met, and through these investigations they try to relieve the stress of the patient and free his mind so he may make a more perfect recuperation.

A few of the illustrations that have come up in my work the last year may be of interest: There was a Chinese woman, who was very hard to get in any way to cooperate with treatment. She even pretended she did not understnd English. The few words she would say were to the effect that she did not care to get well. She refused to eat. On discussing this with the social worker, who had spent a great deal of time and thought on the situation, eventually it worked out that this woman was going to be deported, and her children were going to be sent back to China. When the adjustment was made through the social service investigation, that woman began to recuperate immediately, and her speedy recovery was remarkable.

In association with the Scoliosis and Infantile Clinic there has always been for the past ten years a paid worker who supervises that work entirely, and they have an independent fund for apparatus, for transportation, for supervision of the visiting staff who attend these cases in their homes. They arrange for cooperation between the visitor and the department supervision, and a checker is kept of the follow-up work through the social service. They arrange for follow-up work. The doctor who has operated on the case sees the case and not students.

In discussing this situation, one patient who was quite happy said that he had made ten follow-up visits and had always seen the doctor who operated on him, which made a very happy contact.

Other situations that arise through cooperation of patients generally are met through social service workers. It transfers a lot of disagreeable contacts with your patients to people who are more experienced in handling such situations, and smooths over more disagreeable situations so that your patient is more co operative.

Last winter we had a man who simply would not remove his splint. We would take the splint off, and he would go out of the hospital without it, but when he returned, he had the splint on again. We talked and talked to him, but this happened each time. Finally after investigation by association workers it was discovered that this man was attending an outside doctor and through wearing this splint was collecting $25 a week through a charity association. He could not get motion in the fracture if he kept it splinted. Our idea was to get motion; his was to keep it rather stiff. When the two doctors' opinions were correlated through the efforts of the social worker harmonious conditions were obtained; the patient's charitable assistance was continued without his wearing the splint and there was no conflict.

In adjusting some types of mental reactions, a great deal of good may come. I have in mind a child who was a serious mental problem. The social worker spent almost four and one-half months finding out what the situation was that produced the epileptic attacks. It was finally brought down to the home situation. When it was discovered that these attacks were due to home situations, this child was put in a more pleasing and pleasant atmosphere, into a cheerful boarding house and convalescent home, and it was amazing the improvement that child made.

So the social workers investigate situations that you in your daily work in the clinic would not have the opportunity to investigate. You may have a great many situations arise that you, yourself, cannot meet, and we always present those to the social service. It is practically a routine that all cases are investigated

as they come into the hospital for the follow-up, and if cases need some special reference the physician in charge or the physiotherapist makes the suggestion.

Thank you!

Open Discussion—Mildred Elson, Junior League Curative Workshop, Milwaukee, Wis.

I just wanted to say a few words about the "Relation of Physical Therapy and Occupational Therapy."

In the Junior League Workshop in Milwaukee that has been carried on for a great number of years, and I do not know of another place that has the close cooperation we have. It is one department. We are right side by side, and every case that has physiotherapy probably has occupational therapy as well. It is just carried through the treatment. The Occupational Therapy Department, of course, is under the direction and advice of the Physiotherapy, but we who work as physiotherapists would not do without our occupational therapists there. We would not feel complete at all.

Just a word on the social service. We have crippled children's work, which is under the direction of the community fund. As such, of course, they come from houses and homes that are not as good as others, and probably the home situations are very often poor. We cannot afford to have a medical social worker so that the workers in our organization make a home call check-up on the family conditions, the health, and so on. Before this is done the case is registered in a confidential exchange that we have so that we know if the Family Welfare or the Visiting Nurse or any other organization is in contact with that case. If intensive case work is needed, we turn the case over to the Family Welfare, or if they have been on the case we get a report from them so we understand the home conditions, and understand whether or not we are getting cooperation from the family or the patient.

The same is true of the Visiting Nurse Service in Milwaukee. We work in very close cooperation with them. We even have a transfer sheet between the Visiting Nurses and Junior League on cases that are referred between us, so that work is carried on from the home to the out-patient, without any slip.

Miss Beard: At Northwestern we have tried to correlate physiotherapy, occupational therapy and vocational therapy. All of those departments are under the direction of Dr. Cook, and we are trying to work out a plan of rehabilitation as was mentioned in the article in the last issue of the REVIEW.

Now, as to "Equipment and Arrangement of Floor Space," I think we have all had dreams of sometime being able to organize and plan a new department just according to our own ideas. It is not very often that we are able to realize this, but Miss Edna Griswold, I understand, of the Beth Israel Hospital has been able to have a very fine department.

PHYSICAL THERAPY EQUIPMENT AND FLOOR SPACE

Edna Griswold, Beth Israel Hospital, New York City, (Read by Emily J. Griffin, Montclair, N. J.)

In planning a Physical Therapy Department, its floor space and equipment, one would be guided by the amount of expenditure allowed. I think we might take as a basis for consideration, a Physical Therapy Department capable of giving 100 treatments a day. While conditions vary greatly in requirements and location, the department should be placed conveniently for Out-Patients and In-Patients. The fact that a great variety of cases will be referred to the Department from the various branches of the Hospital and from outside sources, necessitates accessibility.

There should be a maximum of light and ventilation and the Department should not be wholly free of a restful and pleasing atmosphere, as this gives a sense of relaxation to the patient and assists materially in the treatment.

The number of rooms will vary according to the particular Hospital, but the plan in mind calls for a RECEPTION ROOM for PATIENTS containing a sufficient number of chairs and benches; THE DOCTOR'S OFFICE, about 150 square feet, furnished with desk, filing cabinet, chairs and table; AN EXAMINING ROOM of 64 square feet, which would give space for an Examining Table, Instrument Cabinet, Desk, Chairs and a Basin with Hot and Cold water. Proper lighting and wall outlets, the treatment machines, which may at times be used in this room; the MAIN TREATMENT ROOM, covering a space of approximately 240 square feet, should be supplied with wall outlets for D. C. and A. C. above or between each Plinth. This arrangement affords a convenient placing of machines for treatment. In this room the space used for each Plinth may be separated by heavy duck curtains on rods and should be large enough to comfortably care for the patient. There should be small tables conveniently placed for massage of hands and arms. A deep Porcelain Sink should be provided, with hot and cold water, and a closet of shelves is very useful for small equipment, electrodes, etc. The disposition of soiled linen should be considered. There should be an ample Linen and Store Closet adjacent to the treatment room and easily accessible to each unit of the department.

The APPARATUS used in the TREATMENT ROOM might include: 2 Portable High Frequency machines, 5 Cabinet Type High Frequency machines, 1 Polysine generator, I Morse Wave, 4 Mercury Vapor Air Cooled Lamps, 1 Kromeyer, 2 Bristow Coils, I Condensor Muscle Testing Machine, 2 Radiant Light and Heat Lamps, 1500 Watt; 5 Quarter Body Length Bakers, 2 Half Body Length Bakers, 3 Small Thermolite Lamps, with stands.

In the floor space considered, there is no allowance for a fully equipped HYDROTHERAPY ROOM. There is however, a WHIRLPOOL ROOM containing an arm and leg Whirlpool Bath, the space occupied being about 80 square feet. There is also a dressing room for patients, measuring 80 square feet, having curtained alcoves and being convenient to lavatories. An Aides REST ROOM is provided, covering a space of 150 square feet. This room should contain a Couch, Chairs, Dressing Table, Mirror and Lockers.

In adding to a Department of this size, we might consider a STATIC ROOM, or space suitably shut off from the Treatment Room, or space suitably shut off going treatments might not be annoyed by the noise of the machine when in use.

A larger HYDROTHERAPY ROOM may be planned to include besides the Arm and Leg Bath, Light Cabinets, Control Table and Showers, 6 foot Tubs for Nauheim and Continuous Baths, Colon Medication Apparatus, Plinths for Massage and Relaxation after treatments.

Of course there are many accessories to the equipment given above, which are too numerous to mention in this paper. I therefore refer you to plan and equipment prepared by Dr. A. Bern Hirsh, "Organizing the Physiotherapy Clinic," volume appearing in September, 1924.

Hospital Departments—Emily Hammond, Duke University Hospital, Durham, N C.

I don't think that I am very well able to give this because for the past six months I have been arranging and re-arranging my department to see if I could not find a suitable way to fix it up. We were not allowed to build a department ourselves. It was built and given to us; but I think we have now gotten fairly well established so that we can take care of quite a number of patients. At the present time there is only one person in the department, so we cannot handle many patients, but we have the room for them.

We have one large room for our office department, and it is partitioned off by curtains into three other spaces. Two of these are rather small spaces that we use for patients who are getting only massage and kinetic treatment, and perhaps a few plinth exercises. Then there is a larger space where we have plenty of room for massage, heat and any electrical apparatus that we happen to be using, with a mirror, and plenty of room for posture exercise in front of the mirror, which we may use without going into the gymnasium, and in which we can teach patients to do exercises at home that they do not have to have any equipment for. This space also has plenty of room to move a hospital bed in there without having to move our plinth, so that the patients brought down from the wards on hospital beds can be taken care of there.

Then we have another room in which we keep our laundry hamper, our cabinet and tables for linen, and also have a plinth screened off from the rest of the room. This room is plenty large for any measurement exercises that we may want to give.

We have still a third room that we use entirely for ultra violet. It is unpartitioned, but there is space to partition it off into a room for three plinths and ultra violet lamps when the need arises.

Across from this we have selected three rooms. We have just told the hospital that when we need them, we are going to use them. As yet they have given us no hydro equipment, not even whirlpools. We do have the colonic irrigation, which comes under the physiotherapy, though I am not handling that myself, and these three rooms are to be used for the colonic irrigation, one room for a dressing room and one for whirlpools.

Downstairs we have our gymnasium. This is not as convenient as it might be, but it is accessible by an elevator, so that it is very handy. We have quite a long gymnasium, and have it well equipped. We have plenty of floor space. This opens on to a grass courtyard, which gives us a nice place for treatment in the summer. We will be able to handle our children out in the yard in the summer by moving some of the apparatus and mats into the yard.

Adjoining this is a space that we have chosen for our hydro-therapy equipment. So eventually we hope to have plenty of space and plenty of equipment, though it is still a baby department with only one person working there.

Teaching Centers—Emma E. Vogel, Walter Reed General Hospital, Washington, D. C. (Read by Anna G. Voris, United States Marine Hospital, Norfolk, Va.)

The Ninth Annual eight months training course in Physiotherapy was completed at Walter Reed General Hospital on May 29, 1931. The class numbered sixteen, of whom seven were college graduates having majored in Physical Education, the remaining nine were graduates of schools of Physical Education.

If there are vacancies in the Physiotherapy Departments of the various army hospitals, those successfully completing this course are appointed to fill these vacancies and are required to remain in the service for a period of one year. Inasmuch as quarters, meals, laundry costs and five dollars a month are allowed each student during the training period, we feel that our graduates are morally obligated to give at least one year's service in return for the instruction received.

A graduated salary scale has just become effective. Aides beginning salary is $1,320 per annum, increasing up to $1,500 in the fifth year. Head aides receive $1,680 the first year, increasing up to $2,040 in the 7th year. The Supervisor receives $2,300, increasing up to $2,900 per year. The above salary is in addition to quarters and uniform laundry costs provided by the hospital.

The Director of Physiotherapy, the Supervisor and Head Aides, in addition to other duties, give all the theoretical and practical instruction in the various kinds of Physiotherapy treatments. Courses in all branches of Medicine and Surgery are given by doctors on duty at this hospital, in conjunction with the Army School of Nursing.

From October 1 to December 15, students receive all their theoretical instruction in Physiotherapy activities; after this period, students apply this knowledge in the actual treatment of patients under the supervision of their instructors. In Electrotherapy for example, an intensive course in Electrophysics is given, followed by practical and theoretical instruction in the administering of electrotherapy treatments. Each student acts as both operator and patient. In this way she experiences each type of current and is in a position to tell the patient exactly what sensation he is going to experience and thereby is able more readily to gain his confidence. The practice work is arranged in such a way that all students have experience in treating all types of patients in the clinic, and the hospital wards, Orthopedic, General Surgical and Medical, including the diathermy treatments administered to patients suffering from pneumonia.

For the purpose of obtaining more efficient supervision in massage, all practical application in the actual treatment of patients is performed in one room, separate from the main clinic; all thermotherapy and electrotherapy (including the Ultra Violet Ray) treatments are given in the main clinic; all exercise in the gymnasium adjoining.

As far as the actual arrangement of floor space in our clinic, we had no choice in the matter. We were given the plans of a certain amount of space, i. e., the ground floor of the clinic building, with water connections already planned, and were told to fit our department into the space. While we are somewhat crowded, especially in the carbon arc irradiation room, the new clinic has worked out very nicely, but there is still much room for improvement.

Among plans for increased activities for the next year, are included the installation of a super high frequency machine for the treatment of paretics in the neuro psychiatry section; and the installation of a carbon arc light in the Empyema wards where patients may be irradiated with the carbon arc light without experiencing the discomfort of being transferred from their beds to a litter and taken to the Physiotherapy Department for treatment. We also plan to add courses to our

present curriculum. Our course has grown from a four months course to an eight months course, giving the required 1,200 hours as standardized by the American Physiotherapy Association. We plan to add a course in the Psychology of the patient, the application of plaster casts, as well as longer courses in Orthopedics and Roentgenology.

We have developed at least one space saving device which has proven very useful, our plinths—a cross between a bed and a table are constructed in our carpenter shop, so that sliding boards may be pulled out on either side, much as on a desk, these to be used in the treatment of arm cases—eliminating the necessity for small tables.

It is difficult to describe a clinic, the training course and other activities without the use of slides or photographs. Many of you were pioneers in Physiotherapy work in army hospitals, and would appreciate the place Physiotherapy has won for itself in our hospitals, and you would be especially interested in seeing our new well equipped clinic. But to you all, we extend a cordial invitation to visit our clinic and see for yourselves what we are trying to do in our Physiotherapy Department at Walter Reed General Hospital.

Private Office—Hazel E. Furscott, San Francisco, Calif. (Read by Catherine Worthington, Elkridge, Md.)

In planning a Physiotherapy office in a down town building the floor plan is primarily governed by the limitation of high rent. The other factors entering into the plan are the wheeling of equipment from one room to another and the fact that one technician must be observant of the whole plant at one time.

With these factors in mind, especially the high rental, every available space must be used. Equipment is expensive and so to avoid duplication planning must allow for wheeling of equipment from room to room. All equipment that can be hung or attached to the wall save that precious floor space that we pay for by the square foot.

I am submitting with this discussion a blue print which any of you can study carefully if you are interested. It shows the general plan as well as the details of plumbing, electric wiring, special lathes and hooks for wall and suspension apparatus, etc. In planning a physiotherapy office it is very important to include these items that will be installed during building operations as, obviously, they are both expensive and unsightly if installed later.

The Reception Room—As all patients have appointments the reception room may be small. The reception room is 8′3″x9′6″. As all large office building suites have windows along one side and the space must be utilized the reception room and business office have no windows but good ventilation; this reserves window space for the treatment rooms.

The Business Office—The business office in a one technician plant is only a place for records and the telephone. It may therefore be very small. The business office is 7′10″x9′6″. Desk space, a chair for the technician, one for the patient, and the office cabinet furnish the business office. The office cabinet as built in to the Four Fifty Sutter offices is such a work of art in the economy of space that it is difficult to describe. It reaches from floor to ceiling. High over head with sliding doors is a store closet. This is so high that a sliding board similar to a bread-board pulls out from below to act as a ladder to reach the storage space. Below the storage space are two closets. The one is to hang hats and coats, the other is pidgeonholed for stationery, desk supplies, etc., and a slide is provided for the typewriter in such a way as to meet the chair of the desk. Below these cupboards is a built-in row of steel files, complete for histories, prescriptions, financial records, etc.

Treatment Rooms—There are three treatment rooms, two for the usual physical therapies and one fully equipped hydrotherapy room. The hydrotherapy room 8′10″x14′ has tiled floor with waterproof lining. The walls and ceiling are waterproofed. It contains a needle spray shower 3′2″x2′4″ with an open front, for at the extreme end attached to the wall is a Standard Hydrotherapeutic Control with two hoses for the Scotch Douche and controls to the shower and whirlpool. A leg whirlpool is placed in the center of the room, the plumbing and compressed air-pipes are under the tile flooring. By having the whirlpool free from the wall the one pool can be used for both leg and arm bath as the patient can be seated on either side of it. As the window sills are wide and made of marble a steampack for hot fomentations finds its floor space on the window sill. The steam pack is the self condensing variety used in barber shops and as the condensed steam runs back into the water container there is no need for a vent, the window taking care of any steam that might escape. Hooks to carry 200 pounds are inserted in the ceiling of the opposite side of the room to carry the body baker. The baker is counter weighted and may be pulled up and down and so out of the way when not in use. The plinth under the baker can be used with and without the bodybake. This room as well as all treatment rooms has a closet serving a triple purpose. There is a wash-basin in the closet, above the wash-basin are shelves for clean linen and below the basin is a sliding panel boxing off the lower part of the closet for soiled linen. On the cold water outlet of the wash-basin is attached an outlet for the water-cooled mercury quartz lamp and at the side of the closet is a hook for the lamp which is the hanging type and can thus be used in every room. All treatment rooms have a bell system so that the physiotherapist does not have to stay with the patient but may arrange her program to handle as many as three patients at once and yet each patient has absolute privacy. The electric outlets are higher than the plinths (42″ from the ground) to save stooping over. There are two other treatment rooms less elaborate than the hydrotherapy room. They are 8′x12′. One has a ceiling hook to carry 600 pounds for the Sayers Suspension and the side walls have wood backing for the stall bars and posture mirror. Each has a plinth 6″4″x2″ leaving ample space for apparatus and technician. The lamps, infra-red and mercury quartz, the diathermy, sinusoidal apparatus are all wheeled so as to be moved from room to room. The door-ways have no sills to facilitate moving. In each plinth is a drawer to hold blankets and under the plinths about six inches from the floor is a shelf to hold the autocondensation paid when not in use and in the hydrotherapy room shelves under plinths to hold contrast baths. This arrangement leaves doors leading from every room to a hall 3″5″x15″7″ the end of which is walled off to make a dressing room and the opposite end contains a corner cupboard for supplies.

I apologize for including in a discussion on floor space a description of walls and ceilings, but as I have said, floor space has three dimensions where rent is the determining factor.

Industrial and Other Clinics—Dorthy Lewis, Syracuse, N. Y.

I feel very young to get up before this group. I have only been in this insurance company two years, and I

have never had the opportunity of visiting any other industrial clinic. However, during my term with this clinic we have moved into a new building, and I have had a little experience in laying out our materials.

The clinic occupies one end of a business building down town. In entering, one first goes into the waiting room. Off the waiting room are all the other sections of the clinic. First, we have the examining room, in which all our x-rays are kept, and new patients are examined. We, therefore, get an opportunity of seeing our x-rays and studying our patients in there with the doctor.

Next we have two doctors' offices. Then comes the stenographer's room, and next comes the clinic, the clinic proper so to speak. This is one large room divided into 13 compartments, each compartment containing a plinth, a small table, chair, stool and a machine. We have 3 high frequency machines, 3 low potentials, 2 actinic rays, two radiant lights, one Lake whirlpool. In the center forum we have our hand tables for massage, and facing on to this is a box, so to speak, with registers of all the different rooms so that we do not have to stay by our patients.

Off the clinic we have at the present time a combined gymnasium and workshop. The workshop just started last September, and we had no available space for it except our gymnasium, which was really very large so we could take care of it in there.

We have combined our active work along with the workshop, and the technicians work right along with the occupational therapists in there. As far as possible the men are given work to do with tools as part of their active work, most of the patients being carpenters and one thing or another like that.

In this gymnasium we have a rowing machine, bicycle, stall bars, a long mirror for posture work, and so on.

From all I have heard this morning I really think our occupational therapy department works in closer harmony in our clinic with the physical therapy department, than any I have heard of so far.

Educational Institutions—Louise Holt, La Crosse, Wis. (Read by Bernice Ringham, Ypsilanti, Mich.)

As I am located in Wisconsin I am going to make a few remarks from the standpoint of the Wisconsin one room orthopedic school system which has certain advantages over the centralization system which is used in some of the other states. When orthopedic schools can be located in the larger cities throughout the state, the children are able to stay in their own home environment and the time of hospitalization is shortened as the physiotherapy treatments may be continued after the return of the child from the hospital.

For *equipment* certain things are essential: 2 treatment tables (at least); 2 infra-red lamps; 1 ultra-violet ray lamp; 1 stall bars; I movable walker; 1 parallel bar walker; 1 posture mirror (triple); 1 posture bench; 1 table for ultra-violet ray treatments; 1 ladder for walking; 1 steps for walking; 1 Sayre head sling; 1 swimming pool or a Hubbard tank, an under water treatment table, an over head trolley, if there is a pool; 1 foot bath; 1 victrola; 1 stool for physiotherapist; 1 scales to measure height and weight; 1 linen supply closet; 1 medicine cabinet; games and corrective toys; blankets, sheets, towels, curtains , desk, telephone, file.

The physiotherapy departments average about 25 feet by 20 feet for floor space. In some schools the rest room is separate from the treatment room. This of course is preferable. The exact arrangement of the above equipment varies according to the demands of the space and according to the ideas of the physiotherapist. The buildings in which these orthopedic schools are located are sometimes ordinary public school buildings or possibly an old courthouse or a college dormitory or some other building which is no longer in use so the department has to be fitted into the space allowed.

I am sorry that I could not be with you to take up this discussion and to show you the diagram of each of our eight orthopedic schools. If you could see these diagrams which each physiotherapist kindly sent to me in reply to my questionnaire on the equipment and arrangement of floor space in her own physiotherapy department you would realize how difficult it is to say anything cut and dried about arrangement. We are all fairly well agreed as to the equipment which is essential but the arrangement of such equipment is peculiar to each school and to each physiotherapist or to her predecessor.

I am sure that some day some famous architect will work out the ideal orthopedic school and then I hope that all our school boards will see fit to erect and equip such a building that we may give the finest kind of service to the community in which we are then working.

Miss Beard: The next topic for discussion is "Assignment of Personnel to Work." This is to be given by Mrs. Margaret Cleaveland, of Lakeside Hospital, Cleveland, Ohio. As Mrs. Cleaveland was not able to be with us, her contribution will be read by Miss Martha Kearney, also of Cleveland.

Assignment of Personnel to Work—Margaret Cleaveland, Lakeside Hospital, Cleveland, Ohio. (Read by Martha Kearney, Cleveland.)

In discussing the subject of Assignment of Personnel to Work there are two elements which are of prime importance, and which should be the basic guide in every clinic—be it private, industrial or general hospital—the first concerns the patient. He must receive the best care and the most skilful treatment possible. The second concerns the worker herself and is axiomatic—namely—everyone does best that in which she is most interested, and has attained most skill.

It is therefore the duty of the director of a Physical Therapy Department to ascertain the aptitudes and preference of her workers, and so far as possible assign to them those cases and types of work in which they are most successful, and for which they are most enthusiastic. We all know that the spastic is the "bête noir" of some splendid physiotherapists—to another it is a challenge to her patience, perseverance and ingenuity. Not every one can give the neurotic or psychotic patient the understanding care that is necessary.

In some hospitals where there are very large departments of Physical Therapy, Electrotherapy, Light Therapy, etc., are separate units and the patient is transferred from one to the other. That may be unavoidable under certain circumstances, but as the best results from physical therapy are obtained by the right combintion of different modalities, I feel that it is better in general for each worker to give her patient each type of treatment prescribed, and keep that patient through the whole period of rehabilitation. In other words only one worker is then responsible for a patient, and the treatment is more intelligently integrated.

The importance of having each worker follow her own patients through their course of treatment is so obvious it hardly needs enlarging upon. A patient becomes accustomed to a physiotherapist, develops confidence in her, and any change is often detrimental to his progress. For after all physiotherapy is a

judicious combination of physical treatment plus much good psychology.

Exceptions prove the rule however, and in the best regulated of clinics there are occasions when a patient must be transferred to another worker, temporarily or permanently. An encouraging word from the physiotherapist in charge as to the ability of the new worker is very helpful. And here is where the importance of full and explicit records of the treatment being given, is manifest—the range of motion already obtained in the case of fractures and stiff joints, the type and amount of electricity being used in nerve injuries, a list of exercises for the scoliotics and posture cases, the muscle education being given to polios and spastics, etc.

Each worker should keep her own daily appointment sheet, and the director should see that no worker attempts to take more patients than those to whom she can give full time and thorough, painstaking work.

Discussion—Mathea Boxeth

Mrs. Cleaveland has mentioned many of the factors that I had in mind to speak of in the assignment of personnel. I feel in assigning the personnel it is a very difficult problem for the one who is going to choose the technicians who are going to work in the different clinics. There must be a splendid cooperation between the director in charge and the supervisor of the technicians, or otherwise you are going to have a number of technicians, perhaps, who are jumped on or who are not efficient and not qualified and willing to work in cooperation. We find that a great problem especially in the New York hospitals, where there are many technicians from all parts of the country applying for positions.

I think the educational standards should be the prerequisites for assignment to a physiotherapy clinic, and that a personal interview should be one of the main factors. Education from the standpoint of our Association, if possible, would be very advisable.

Secondly, I consider personality the greatest factor in the technician who is going to take charge of the work. Her general appearance, her manner, her smile are all factors. She should be one who invites confidence. If you are any judge of people you will be able to tell what type of technician you want in your department.

References—although it is a very difficult problem to accept references, I suppose we must have them. The only time they amount to anything usually is when you know the person who is recommending the technician.

I would like to speak somewhat of the professional ethics of a technician towards her seniors and co-workers. First of all, she must have her patient's welfare at heart, regardless of their circumstances. It is a sad state of affairs when tipping has to be employed in order to get proper treatment. Neatness of dress and personal hygiene are essential. Wearing of jewels and chewing of gum should be forbidden in departments. (Laughter.) Progressiveness and interest in developing knowledge of physical therapy work should be one of the greatest aims of a technician. In order to carry on, we should all make it a point of studying the work.

We have, of course, in New York a number of large departments. We have a number of technicians who are supervised by the graduate physiotherapist, and we have also a number of department aides. Here I may mention that our desk girls are called aides, and they make all appointments for the department.

Each technician is in charge of her own patients and follows up her own cases and takes care of her appointments, but the appointments are made at the desk. I find that each technician takes more interest in her work if she has her own patients, and she sees that these treatments are minutely administered according to the way the charts read, and we can see that we get splendid cooperation in that way.

The supervisor also must be willing to cooperate with her workers in every way. She must understand her workers. She must understand their problems. She must gain their confidence so that they will come to her with all their problems. If a patient receives an electrical burn, the technicians should not be afraid to come to the supervisor and report it. You will find many times it is not being reported unless you have the confidence of your co-workers.

Ruth E. Johnson, Rhode Island Hospital, Providence, R. I. (Read by Lucile Elwell, Boston.)

In order to have a smooth running department; avoiding friction between technicians, as well as patients; attaining a high percentage of efficiency, the assignment of personnel is of the utmost importance.

In choosing the personnel several factors must be considered. Viz. The size of the institution; the type of work to be done; the number of treating rooms; and the amount of equipment.

Every Physio-therapy department should have for its head a physician as supervisor. He should examine all new patients and prescribe the type of treatment. Also keep a watchful eye on the condition of the patients.

Next should be appointed a sub-head or assistant, preferably a graduate physio-therapy technician, whose duties shall be to supervise the work of the other technicians, teach the student technicians, and assign the work.

There should be male and female graduate and student technicians.

A secretary should be employed to make appointments, keep case records, and handle the correspondence.

My experience has been in a large hospital with a fairly large physio-therapy department. About 125 patients are treated daily. The department is divided into three large treating rooms and a cabinet-bath room, which is used alternately 3 days for male and female patients. One of the large treating rooms is for men, the other for women, and the third is used for ultra-violet treatment, the majority of the patients being children.

We have five graduate and two student technicians who are assigned to certain rooms for a definite period of time. Every 3 or 4 months the personnel is changed around to different rooms and work. In this way each technician is kept familiar with all branches of the work and it does not become so monotonous.

In a large department it would probably be more efficient to have the graduate technicians do the type of work they are best suited for. As in massage where the work is more strenuous. All technicians are not qualified to do it and others are fitted for it and choose to do just that branch of it. Of course the student technicians should be trained in all branches of the work.

After a department is well organized and each worker has only one branch of the work to do I think the work would be more efficient, especially if each worker was best suited for his or her particular work.

There can be no universal plan for assignment of personnel to all physio-therapy departments. They all vary in type of work, size and equipment.

To have a department function harmoniously there must be cooperation between all the workers.

Miss Beard: We will now have open discussion of this paper from the floor.

Personally, it has always seemed to me that in speaking of personnel the matter of personality was one of the things to be considered. Training, of course, is most important, but it has seemed to me sometimes, particularly in private practice, that if an assistant were well trained, and had good fundamentals, I would rather have 75 per cent personality and 25 per cent knowledge. If a girl were ambitious, and were willing to learn the new methods of a new position, it has always seemed to me that it was perhaps more important to have the personality there, and train or mold the material afterwards.

Is there any further discussion of this subject?

Margaret S. Campbell: It would seem to me in assigning work to personnel that if we only give to one physiotherapist the type of case in which she is most capable, we are going to narrow the girls in our departments very greatly and put them in the field of specialties to such an extent that they will be very much handicapped when they are thrown from positions where they did this type of work to new positions where they come in contact with work that is not of that particular type they have been handling.

Also the type of a particular personality with patients should be clearly understood as in no way reflecting on one particular physiotherapist. The fact that her personality does not exactly fit in with that of one patient is no indication of her worth. I think people who are handling departments often find that their best workers may be criticised by one person because of their personality whereas other patients will think those physiotherapists most able. So we must consider that our personalities, no matter how efficient we are, are not always going to fit in with the same patients.

Miss Elwell: I would like to say that although I read Miss Johnson's paper I am very much inclined to think that Miss Campbell's remarks are most pertinent. I believe there is a variance between what Miss Campbell has said and the paper, and I think Miss Campbell's remarks are very important and should go down in the records.

Miss Beard: The next subject for discussion is "Patients Daily Records" by Miss Dorothea M. Beck.

"Patients Daily Records"—Dorothea M. Beck, Montclair, N. J.

Madam Chairman and Fellow Members: The question of records has proven to be particularly difficult. It comes down to a matter of compiling a human individual with all his peculiarities, both congenital and acquired, into paper and pen and ink, and that is extremely difficult.

It is also difficult to make any definite classification of records because private offices, hospitals and other institutions need their particular stress on their particular specialty. So, perhaps, it might be wise to look at records from a broad standpoint before they are discussed by those who take up hospital departments, teaching centers, private offices, and so on.

There is required some general information. It must be clear, concise and complete. That is taken for granted. Then there is particular information, first about the patient, who and what he is, man, woman or child; his occupation, his address, age, date, financial status, which means private, clinic or charity patient, nationality and hospital or clinic chart number. The referring department should also be known, whether from the neurological department, from the medical department, or whether the case has been referred by an outside doctor.

The history should be known; his family history as it bears upon the individual's case, and his personal history, past illnesses, past occupations and onset of the present illness.

The clinical findings and examination should also be on the patient's records. Both the general, and the specific findings for the part which is being treated should be there in their entirety.

All reports should be together. We should be able to find the x-ray, bacteriological, basal metabolism, chemical, electro-cardiograph, photographic and other records in one place.

There should be a record of the consultation and re-examinations as they come along in the record of the case. There should be the record of those special examinations such as muscle analysis in a case of poliomyelitis or neurological examinations and findings, and so on.

Then, of course, diagnosis. It is rather astonishing the number of hospital records in which you search widely to find the diagnosis. Very often it is omitted. You don't know what you are treating, or why. You don't know why the patient has come down to you. That diagnosis should be both the referred diagnosis and the revised diagnosis.

Also there should be the treatment record: the revised treatment, and *a daily record of the treatment that is given,* which means the dosage, time, technician's initials, etc. (In this treatment record there should also be the prescribed treatment. As it is first requested by the referring physician and the revision, if any, as seen necessary by the director of the department.)

There should be a progress record, a subjective progress record showing how the patient in general is reacting, for unless you can keep your fingers on the pulse of the general personality, you are going to miss out in the particular field you are treating. As well as the subjective progress records, there should be an objective record shown by x-rays, photographs, measurements, muscle analysis, and so on.

Then comes the disposition, what is finally done with the patient. Is he referred to another department or another doctor, is he put on observation, is treatment continued as is, or is the patient discharged, and of course all pertinent dates. These, by the way, should be found all through the charts and records, identifying each annotation.

The methods of recording such information are varied. One method is by card index or file, which merely identifies the individual as a patient. Here appear the name, address, date, occupation, telephone number, nearest relative or guardian, financial status, referring doctor, type of patient with corresponding number (in other words, if it is a hospital or another clinic case) the date of admission, department number, date of disposition.

This may be a department card with its printed headings so that the record for each individual is identical, or it may be a uniform referring card from other departments. If so, it should also contain the condition to be treated and a general prescription.

Then come the methods of recording the informa-

tion of the patient's condition and treatment. Those may be large cards, or it may be, as is generally the case, a sheet of paper 8½x11. Here we will find the information relative to the patient and to the department, history, diagnosis and date (all of that information taken from the particular information which we mentioned a few minutes ago but selected for the particular needs of the department, whether it is a hospital, clinic or private office). The treatment routine should be there, its detailed prescription, and the record of daily work. There should be signatures, both of the physician who examines and prescribes and of the technician who gives the daily treatment, dates of examination, consultation, progress, re-examination and disposition.

This record may be kept in the department. If so, it is very often kept in a folder, where the various other reports from the x-ray, laboratory, etc., which we have mentioned, are also kept, so that there is in one place the general compilation of information; or it may be kept in the hospital chart. If so, it is generally of a distinctive color, and this hospital chart comes with the patient to the Physical Therapy Department. In many hospitals where the records are kept in the department these sheets have a prepared list of various modalities and all the treatments given in that department, a lined and blocked calendar on which dates and initials may be checked; and a routine of a certain number of treatments before the patient is referred for re-examination or for consultation.

Therefore, the department records may be only these two which we have mentioned (the identification card and the full sheet), or they may be further developed by adding an appointment book. These may be timed by the quarter hour, with each piece of apparatus or treatment listed. This will show at a glance what treatment may be given at any time. It is very easy in that case for the head technician or the supervisor to keep in touch with each patient, treatment, and other technicians. It is possible to get a quick resumé of the day's treatments, a summary of the week and of the month from such a book, and finally the waiting of a patient for treatment is reduced to a minimum.

If the appointment book is not used, a deduction may be made for the day, week, or month, or even year from the accumulation of the patient's charts on the desk at the end of the day, showing the number of treatments given, the number of patients seen, whether they are new or old, the number of patients disposed of, whether they are referred, discharged, etc. Those may be accumulated by the individual technicians or by the head technician.

Further there may be added a chart for cash statement, whether it is a private, semi-private, clinic or charity patient; the money in hand, and so on. Or it may be merely a summary to tally with the treasurer's office in case the department does not handle cash itself.

There should thus be charts for the departmental reports: number of patients, treatments, cash, technicians, for the day, week, month or year.

This sounds extremely lengthy, wordy and complicated but is quite simple. The cards, which are the method for quick reference, may be filed alphabetically. The patients' records, if kept in the office, may be filed by department number, and, as I said before, may be in folders for the preservation of the thin sheets: (records of special examinations, photographs (unless otherwise filed) or any other loose papers). The appointment book, of course, is intact, and any prepared department sheets or carbon copies may be punched for binding so that a complete department record may be compiled and conveniently kept without danger of loss of special sheets.

The adaptation of any of these records as taken up by the hospital departments, teaching centers, private offices, industrial and other clinics, departments of educational institutions and other members, is now taken up by the discussion.

Hospital Departments—E. Polly Perkins, Millard Fillmore Hospital, Buffalo, N. Y.

Madam Chairman and Members:

I feel that perhaps the records that I will give you will be inadequate or very simple because the hospital from which I come is a rather small one; at least we consider it as small. It is a private hospital of 350 beds. Up until six months ago we think we have been rather handicapped because we have never had a doctor at the head of our department, not officially, only in an advisory capacity. About six months ago the doctor who is in charge of the X-Ray Department was made the official head of the Physiotherapy Department. However, he does not come to our department each day. In fact, he does not come unless we send for him, and sometimes two or three weeks go by, and we don't even see him. We only send for him when we wish for some special advice on some cases, but we hope very soon we are going to have a better system worked out, and he will give certain times each day to our department because the whole hospital I might say is in process of reorganization. He is rather new in the X-Ray Department. He is reorganizing that and, therefore, we have just been reorganizing our own department, and especially our system of records.

I am sorry to say that I cannot tell you that these are workable records, though they are very simple, because they have not been in operation a sufficient length of time. We felt in the past how inadequate our records have been, but as I said we have had no medical head, and there has been so little investigation into what we were giving. All the records we kept before were just for our own benefit in our own department because they have never been looked up.

In the first place we have no out-patient clinic connected with our hospital; at least we had not until last Christmas when they started this free out-patient clinic. It is a very, very small one. We are not in any way connected with it except through the treatment we give to the patients they send to it. We are not connected with the Social Service Department, etc., because our social service work is quite limited and really not under an organized worker. So you see we are really independent. We have no free wards in our hospital. They are all paying guests, as they are called.

This is our new system that we have just installed so very recently: It is very simple, but we have tried to make it as simple and yet comprehensive and complete as we possibly could. We sent all over to so many different places for suggestions. I know there are several here to whom we have written for samples of their records, and we have tried to evolve our own system from them.

In the first place we are putting these requisitions on the floors. Of course, we had requisitions before, but they were very simple ones, and we discovered that the doctors so often would not give the diagnosis, they would only say "Physical Therapy Department." I think they often just ordered the things without much thought, simply indicating heat and massage when we have so many other types of treatment. So we made out on our new requisitions a list of our types of treat-

ments. The one desired has only to be checked off. A copy of this requisition is to be kept in the patient's file or the patient's chart, and we have a copy of it as well. If anyone wants to see this requisition, I should be very glad to show them this. It is very similar to that used in other hospitals. We have the diagnosis at the top; then the part to be treated, and then the type of treatment to be checked, and down below is a space for remarks. This requisition is to be signed by the doctor or the intern through whom the order may be given.

As I said before, this is kept in the patient's chart, as well as one copy in our department. Of course, there is the usual data at the top: the requisition number, number of patient, room number, and so on. I need not go into that in detail.

Then at least every two weeks—sometimes oftener if it has been a series of treatments that has been ordered, like a series of 6, 8 or 10, at the end of that time—we send this report to the floors to be put in the patient's chart. This is very concise. Again the diagnosis is given; the date; part treated; treatment; technique, and the response. That is kept on file in the patient's record, and of course some patients who are there for a very long time will have several of these on file in their chart. We keep a copy of them until we have made up the final report, but that is not always filed with the reports.

Then there is the concensus of the whole treatment, and the history of the particular case is on this filing card, in which we try to get everything in as small space as possible. On this, again, is the usual information about your case number, room, requisition number, name of your patient, physician, when entered and when discharged. On the back of this is our daily record of treatment. There is a space covering a whole year, though to be sure we have some patients longer than that; but if so, you can have two cards on that. That is your daily record. Then inside this is the whole résumé of the case, with your diagnosis, your history of the case, the treatment and progress. This is the card that is finally filed for the patient. Before the treatment is finished, however, this is clipped to an envelope—and let me say that all our material about each patient is filed in an envelope of this sort with the name and address of the patient and physician's name on the outside—and during the time of treatment this is just clipped to the back so that they eliminate having so many files. Then when the case is finished all the material in regard to the patient is put in the envelope, like the x-ray reports or any reports from any other departments, or any material which we think should be filed, as well as the original requisition.

This is just a sheet that we send out to the doctor now and then if he does not frequent our department and if we don't get in touch with him personally in regard to his patient. We send this at the end of a certain series of treatments, or at least at the end of every two weeks.

We have a great many out-patients, sometimes more than hospital patients. We do a great deal of compensation work, and all the rest are private cases. This is a form we send to the doctors, and we have made it so that all the doctors have to do is so little they will always send it back. On this is the doctor's name and the name of the patient, and then here is a line on which appears "has completed a series of" whatever type of treatment the doctor has ordered, administered to whatever part of the body was necessary. Then there is a perforated line, and below that "Do you wish these treatments to (the patient's name) continued, discontinued or changed." Of course, here is a space for remarks, and to be signed by the doctor. All the doctor has to do is just tear this off and send it back to us.

I might say here that we do a great many cases for doctors, whom we have never seen. We always get in touch with them, of course, when the requisition comes in by telephone, but we have done treatments that we have not seen the doctor who ordered them.

As I have already said, our system of records may be very simple; maybe too simple. I should be glad and grateful for any suggestions you may have to offer. We wanted to make them as complete as possible and yet on as small a space as possible in our card system for filing.

Of course, I did not mention that we send a record to the office every day of all the patients and types of treatments. That is a usual proceeding. Also a record of the types of treatment, the number, and so on, in detail is given monthly to the superintendent. He is the only one who has asked for a record so far. Our reason for filing in the patient's chart is twofold: We do it not only for the purpose of our own records, but to keep physical therapy before the eyes of the doctors, because may I say here that we have been somewhat handicapped in working in a hospital where not every doctor is in sympathy with the Physical Therapy Department.

Teaching Centers—Mabel Holton, University Hospital, Ann Arbor, Mich.

I am not going to read all of these, and am not going into all of them in detail because after all a great many records are duplicates; that is, the situations in various hospitals are much the same, and the difference is only in detail.

Considering that we are a teaching hospital, both for medical students and for technicians—and may I also say for staff men—we feel that our records should be as simple as possible, and that we make our records only in terms of statements of actual measured gain. We make no comments on improvement. We insist on written orders, something on the order of Miss Perkins' records, in which the doctor checks the treatments and gives the information which we need for our own department, not social service records, because that has already been done by the Social Service Department, but the patient's name, diagnosis, treatment desired and his signature. No orders are accepted without a signature. We also have a space in which we can put code records of treatment received on that day.

We also have a bright pink card which goes back to the doctor every week or two weeks, saying "Treatment continued as previously ordered. Will you please discontinue or reorder?" That must be signed. I think Miss Perkins got that from us.

I am putting these on file. Our other records, muscle tests or electrical diagnosis, those go in the chart and are simply for a record of treatment actually given or treatment which we can actually measure. Comments must come from the staff men, and students must get comments from them. We do not feel that we are competent to put these comments in the charts.

The next set of records I have here are clerical records which are necessary in reporting the number of treatments given and making contacts with the main office and securing the data from which we can make graphs and find out how many patients we treated, who is referring, what kind of treatment, etc. That, after all, is a clerical job and must be worked out for each particular situation. We have worked it out on the

basis of what we must do. That is done by a clerk and not by our physiotherapy technicians.

Our next set are instructions which are given to the person doing the treatment on a patient. None of our forms are complete in themselves. They must be filled out. The carbon copies must be put into the chart and the original copy given to the patient. That means that the student looking over the chart, the technicians, the staffman can all see what we have done, and if there is any question we are always available.

I have also included one outline of massage, which we use, amplified sometimes. It is a skeleton arrangement for our teaching massage to our medical students and to our technicians.

We find some various situations that we cannot make any definite rules on. We find that records become obsolete, the forms become obsolete, new situations arise, so most of our forms are mimeographed. We put nothing into print unless we have proved its worth, and usually we take six months or a year to definitely prove that a thing is necessary. We have our distinct colors for our orders. No other department has that color, and the other records are the white, the same as the other hospital records.

I don't know whether I have covered the situation or not. I am not convinced myself on any one set of records yet, and I don't know whether I will ever be. We feel that we can change at any time.

Private Offices—Mary Lee Castleman, Washington, D. C.

From a Doctor's viewpoint:

1. Whether physiotherapy technician has registered: 1. diagnosis; 2. object points; 3. danger points of treatments ordered. Frequency, amount and kind of physiotherapy ordered.

2. What is happening to a patient under treatment: 1. Reaction to stated treatment included in exact statement of what treatment the patient got.

From a physiotherapy technician's viewpoint:

1. Statement of ability to register location of injury or type sickness, correct relative diagnosis, and amount and frequency of treatments.

2. That reports are typed after each treatment, before forgotten in exactness, and sent to doctor after first treatment and at intervals of re-examination and stopping treatment.

3. Copy should be kept in file in case of needing a future accurate reference.

Reports should be simple, similar in style from same office to all doctors, typed, clearly expressed, condensed, but full enough to contain some points of interest of each treatment. Should be on thin substantial, never scratch, paper, suitable for preservation in patient's file.

I have found a general complaint from doctors that after they assigned patients to physical therapy in private practice they never heard from their treatments as to reports again. I have worked myself overtime many days keeping up reports, but if I don't the doctors call up to know where they are, and I consider that a good sign of appreciation of work of good standard.

Elaborate reports, clumsy reports or vague reports should be entirely avoided, as they are only fit for the scrap basket in a busy doctor's office.

Discussion of Practical Difficulties of Reports, Private Practice.

A. Reports should be simplest possible, as in private work what patient pays does not cover cost of secretarial work.

B. Technician selling her work to large group for referred work in private office practice meets some difficulties.

1. Distributed my forms to group of about 300 doctors and surgeons.

2. This was considered dictating method of assigning physical therapy patients to doctors.

3. Orders came in to bake and massage every patiet regardless.

4. After 1st treatment and at end of treatment. Found best to keep off too much general information about patient and stick to what concerned immediate problem in physical therapy.

5. Difficulties which arise while patient is under treatment should be reported informally to doctor, not put on written report as writing them give impression of criticising of doctor's orders or that technician is unable to carry them out.

Industrial and Other Clinics—Helen Sneltaker, Philadelphia.

The Medical Dispensary of the Pennsylvania Manufacturers Association Casualty Insurance Company was established some 12 years ago by our present Medical Director, Dr. Edmund B. Sweeney. At that time, he, alone, spent two hours per week in the service of the company. He now spends five days per week and is assisted by a nurse, a secretary and two physiotherapists who give 5½ days per week.

The method of keeping our records has, therefore, grown with the work itself and has been tried and sifted, so that there is no over-lapping; yet all necessary information is at all times readily available.

During 1930 over 18,000 patients were treated, more than 12,000 of these receiving physiotherapy treatment.

The daily records kept by the Medical Department of a Casualty Insurance Company are kept with the idea of benefit for the Company and not purely from the standpoint of the Medical Profession.

Two departments of our company must keep records of all injuries, their duration and final settlement—the Medical Department and the Compensation Claims Department.

In our Medical Department, we have cards, alphabetically filed, on one side of which appears the patient's name, address, claim number, date of accident, date of disability, and the name and address of his employer; also a graph covering a period of 12 months. Each visit to the office of said patient is checked on this graph. There is a system of symbols which tells of the patient's trip to x-ray, his subsequent visits to the Medical Director for re-examination, his visits to the Physiotherapy Department, etc.

On the back of this card is a copy of the principal items of his first examination by our Medical Director, the diagnosis and prognosis and the x-ray report. There is also room for any remarks which may throw light upon the case.

Daily Report Sheets, one white, one pink and one yellow, with room for 100 names each, are stamped with the date and given to the Surgical, the Physiotherapy and the Recording Departments. Each patient's name, the date of his accident and the time of his arrival in the waiting room, is noted on the yellow sheet by the recording secretary. In his turn he is sent to either of the other two departments by our secretary. There the same notation is made on our respective sheets.

In the Compensation Claims Department, all records are kept in a large folder, filed according to claim number.

This Department also must have a complete and detailed record of every injury. The Department of Labor & Industry of the State of Pennsylvania requires that a report of every accident be filed with the Insurance Carrier and the Bureau of Workmen's Compensation by the Employer. This accident report gives complete data on the cause and extent of the injury.

This accident report is placed in the folder. Stamped on the inside of the folder is the same 12 month graph that we use in the Medical Department and the same system of symbols is used, so that the two records always tally. Dr. Sweeney's first examination on a yellow form sheet, the X-ray reports, Hospital reports, the medical attention before the injured came to us and bills for same and all records having to do with the injury; all these are kept in this folder. These are the items of interest from the Medical standpoint. But all agreements concerning compensation, its payment, etc., are also in this folder.

Besides these official records kept by the Company itself, the Secretary, the Nurse and the Physiotherapist, each keeps a note-book of her own in which appointments are recorded, notations announcing the patient's visits to the Medical Director, items concerning the progress of the patient, etc., are kept.

The above covers in a general way the method of keeping records in the Medical Department of our Company.

Departments of Educational Institutions—Lorraine Fritz, Lansing, Mich.

After hearing all these splendid papers and reports, I feel as if I should take a back seat and remain there because I have very little to say. The project we are working on now is to incorporate or introduce a system of physical therapy in a central school for crippled children, and combine it with work out in the county so that the whole thing, county and city, will be under one head.

When we began this school a year ago we had 5 students, and now we have 52. We had about 100 on the list to be investigated, and now we have over 230. But we do not have any definite way of keeping our files because for one thing we have not had the money to purchase such material as was needed, and we felt it would be better to wait a year or so until we were better organized. However, we do keep a personal history of the case; that is, a social service history.

We keep also our clinic reports. We also have the Michigan State Commission reports that come from the Michigan Crippled Children's Society, and then we have the social service report from the hospital or clinic the patient was examined in.

We also keep a daily record of the work that is being done. We have three ways of doing that: One is a form blank that we have made out for the time being with the name of the patient, the diagnosis, the treatment, the time, and a column for remarks. That, of course, is not practical when you have the same patient every day, but unfortunately we have a patient one day, then two weeks later maybe we will see him again. The other one is to keep a daily report of the treatment the patient has had. We have an alphabetically arranged list of the names of our patients. We have the dates on this, that is the days of the week and the months of the year, and on that we check off the treatment the patient has had so at the end of the month by looking at this one sheet you have everything in front of you. If you wish more detailed information you know the dates on which there is a question, and you can look up for further data in the daily record.

Another thing we have to keep is the expense report. Our patients are not all brought in to us. There are country schools, that are classified as school cases, where we have to go to, so we keep a daily expense report on both of our sheets, and also the time in travel. That is, if you have a patient down in the southern part of the county, it is 30 miles away, and it takes a certain length of time to get there. You have to put that in this report so you will know just how much better you can arrange your work when you have two or three people in the same locality by bringing them to a center. That is what we are trying to do. Perhaps, next year we will do it better and have more efficient reports. I hope we will.

Miss Beck: There is very little to summarize with all these splendid illustrations of the records: simply a memorandum that this information, which is so important, should be easy of access to the workers and doctors and should present a complete picture and history of the patient.

Methods of Measuring and Recording Joint Movement —Margaret Campbell, University of Chicago, Chicago, Ill.

When the motion in a joint is impaired, the aim of the physiotherapist is to restore normal function. It is therefore only natural that we have turned our efforts towards methods of recording the progress made. Most of us are taking measurements, but would the record of these measurements be clear to any one who might read them? One writer states that 45° of wrist flexion is possible, another says 135°—by some the mid-position between supination and pronation is called 90°, by others 0°—measurements of rotation are still more confusing. We are quite comparable to the "Tower of Babel" in our language of joint measurement.

The definition of measurement, as we doubtless know, is "the act or process of ascertaining the extent, degree, or capacity of a thing." Measurement of joint motion is called arthrometry or mensuration. Many instruments are used, some more or less complicated. The simplest and most inexpensive instrument is a small folding protractor made for carpenters, which can be carried in a pocket. This is satisfactory for measurement of flexion and extension of the larger joints, but for measuring the fingers a smaller instrument must be used. For measurements which need be taken in relation to a vertical line, a protractor having an arm that is heavy and free enough to fall vertically, is used.

Tracings made of the outline of an extremity are inaccurate because of the possible variations in soft tissue caused by swelling, fat, muscles that are relaxed or contracted, atrophied or hypertrophied. The one exception to this is measurement of the fingers and toes which must of necessity be an outline measurement. Soft strip lead for tracing finger flexion is fairly accurate, if the movement is recognized as not entirely active.

In angular movements the arms of the protractor are applied so that they are in line with the bones forming the joint, provided they are two long bones, and the fixed point of the protractor is over the fulcrum of the joint. In this way the decrease or increase in the angle caused by the movement in the joint can be read. But, in movements of the extremities in relation to the trunk, or fingers to the hand, etc., a definite rule should be made as to the points of measurement. In such movements as flexion and abduction of the arm, hip, and fingers, let us speak of the long bones or the extremity as the *movable line*, and the trunk or hand respectively as the stationary or *fixed line*. Care must be taken to have the body as straight as possible, the shoulder girdle and pelvis having on both sides the same relation to the median line, i. e. do not allow patient to twist the body, elevate shoulder girdle or the pelvis.

If we measure flexion of the arm standing, we consider the vertical line the fixed one, the humerus the movable line. With a protractor placed with one arm in line with the humerus, the other arm falling in a vertical line, we can read the amount of flexion or extension. The same method applies to flexion and extension of hip, abduction of arm, each measured in its respective plane. Abduction of the hip is measured with the fixed line running across both anterior superior iliac spines.

If the measurement is to be taken with the trunk horizontal, the fixed line should be—(1) a horizontal line (2) a line parallel to the median line of the body (3) the anatomical median line—as in the hand, through the 2nd finger and metacarpal bone; the foot, through the 2nd toe to the mid-line of the heel.

The simplest method of measuring rotation of the hip is to take the measurement at the knee, which should be flexed to 90°, the fixed line a horizontal one and the lower leg the movable line. The same method applies to the shoulder except that the fixed line would be a vertical line if the patient stands, and abducts the arm. In supination, the elbows are flexed to 90° and held close to the body, the movable line taken on the volar surface of the wrist, the fixed line vertical. In pronation the movable line is on the dorsum of the wrist.

In abduction and adduction of the foot—the fixed line is horizontal, the movable line through the anatomical midline of the foot. This will not be an accurate measurement as it is combined with inversion and eversion.

The position of the patient depends on several things. Is it *active* motion we wish, or *passive?* If there is a difference between the active and passive motion, does it not give us a more complete picture as to the relative conditions of joint and muscular power? Active motion is that performed by the patient's own muscular strength, against gravity or in a neutral position, i. e.—movement in the horizontal plane. For example, for right knee flexion, the patient is lying on the right side, the left leg is supported above the right leg by the operator, the right thigh is held in a flexed position, knee extended, and the patient attempts knee flexion. Care must be taken that hip movements are not permitted to cause passive knee movement. Passive motion is that done with the aid of gravity or done by some other force than the muscular power which moves the joint in question. If the lower leg is allowed to fall over the edge of a table or chair, passive knee flexion is performed. If pressure is applied the range of motion may be further increased. The passive motion caused by muscles moving over more than one joint must not be ignored.* For example there is more or less passive extension of the fingers in the normal hand when the wrist and metacarpo-phalangeal joints are flexed, actively or passively. The position of adjacent joints is of greater importance still in conditions where deformity is present. For example hip flexion contracture prevents the possibility of measuring the knee flexion with the hip completely extended. We must therefore have several alternatives for the measurement of all joints and preface the record by the position in which measurement was taken.

The confusion in recording measurements is largely due to the fact that some consider full extension 180° and others consider it zero, and consequently two scales are used for measurements in the same plane. The fixed line should have zero at one end and 180° at the other. If we are measuring flexion and extension in one joint and keep zero in the same position for both measurements we will avoid confusion and can very easily figure the range of motion. This should apply to all measurements. The simplest rule seems to be the following: We measure and graph limits of motion; from these the number of degrees can be worked out.

Adduction	Increases the angle	(at times beyond 180°)
Abduction	Decreases the angle	
Extension	Increases the angle	
Hyperextension	Increases the angle	beyond 180°
Flexion	Decreases the angle	
Inward Rotation	Increases the angle	
Outward Rotation	Decreases the angle	
Supination	Decreases the angle	
Pronation	Increases the angle	(sometimes beyond 180°)

Combined movements must be recognized as such, and not confused with pure movement.

Miss Elson: The protractors are made by a machinist in Milwaukee. The cost is $10 for the two instruments. His name is John O. Polzer, 4739 North Nineteenth Street, Milwaukee, Wisconsin.

These were originally designed by Marguerite Taylor, who is our director, while at the Walter Reed Hospital, and Robert Brigham. They have never been patented, although we have urged her to do so. However, she wanted to keep them cheap so everybody could get them. Lots of questions have been asked about them. The Modern Hospital has just written this man, and I believe there will be something about them in a recent number of Modern Hospital.

I don't know that I can add anything to what Miss Campbell has stated. It is exactly the method we have been using, and it is a logical one as it has a geometric basis. It eliminates guesswork, and if you are able to record even a gain of 2 degrees it has a great effect on the morale of the patient, although it does not seem much to us. Also in our industrial accident work we have found it very valuable in reporting the exact amount of gain to the insurance company.

Mary McLean: I feel that Miss Campbell has given us a very good demonstration on measuring the different joint movements, so I will not go into that.

I have some pictures here in which you might be interested of the type of measuring devices we use at Walter Reed. They are very similar to yours, although I know yours are far more accurate. We have never been able to get really accurate measurements, but inasmuch as the measurements are usually taken to show the progress of the patient, probably the variance will be in the same ratio right straight through.

I do feel that measuring gives the aide some idea as to whether the present treatment she is giving is retarding or helping her patient's progress; also it does stimulate an active interest in the patient himself in his treatment. We find at Walter Reed that the Chiefs of the Surgical and Medical Service often send to us for records regarding the patient's measurements. We keep a graph very similar to the one Miss Campbell showed you, and from these the Chiefs of the Medical and Surgical Service often determine whether the patient has reached his maximum improvement from physical therapy treatment. The patient's progress is not wholly dependent upon the measurements, but it does help.

*Muscle Function, by Wilhelmina G. Wright.

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